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Westward Ho!

"I realize that patriotism is not enough;
I must have no hatred or bitterness towards anyone."

Mount Edith Cavell

ONE cannot spend any time in the tranquil regions of Jasper Park where our Association is to hold its Annual Meeting in June without recalling the lines above quoted. The memory and spirit of Edith Cavell seems to pervade the place. Now that we are passing through the trials of another war of aggression few of us will be able to enter the lofty regions reached by Edith Cavell. We are more likely to agree with Air-Marshal Bishop who in a recent address spoke of the place for "healthy hate". But, whatever our convictions may be there could be no more suitable place to ponder such far-reaching

questions. Mount Edith Cavell, a giant 11,188 feet high, dominates the scene, yet suggests tranquillity rather than frowning majesty.

Jasper Park is the largest sporting paradise in the World, having an area of 4,200 square miles. Let us see how much of it we can occupy next June! For, here the visitor can enjoy many forms of sport and feast his eyes on magnificent scenery.

Jasper Park Lodge, our headquarters, has many memories also, but of a different kind. It is situated on a tranquil mead on the upper reaches of the Athabasca River, at or near one of the most important resting places for hunters and explorers looking for a passage through the mountains to the great Western Sea—to China and riches. About 1821, traders, coureurs-de-bois, explorers, naturalists, and many others forgathered here. Notable among these were Sir Alexander MacKenzie, David Thompson, and Simon McTavish. Therefore the visitor may indulge his artistic sense and at the same time make acquaintance with striking events in Canadian history.

Here, too, are the headwaters of rivers which empty into three oceans. Something of the feast that awaits us can be gathered from the words of a distinguished colleague of ours—Conan Doyle, describing Lac Beauvert, on which the Lodge is situated said, "It is the most remarkable of all those that I have seen in the course of my extensive travels. Its colours are never the same from hour to hour—emerald green, verdigris, lapis lazuli, pure olive, and then a rose pink which transforms the whole into a vast opal." The witchery of the scene when the Lake is bathed in the light of the full moon is beyond the power of words to describe. To intrude a scientific program under the circumstances seems little less than an impertinence.

The trail to the West is known as the Yellowhead Pass which follows the course of the Miette River, through the Miette Pass dividing about twenty-five miles from Mt. Robson, one branch going towards the Columbia River, and the other making for Prince Rupert. Why "Yellowhead"? No one knows. It is a safe guess that it was so called after some well-known denizen of the district whose tow-head, "Tête Jaune", contrasted with the black polls of the French and Indians about him.

Excellent roads call to numerous excursions. Perhaps the best, as the most scenic, though some fifty miles long, is the new Columbia highway to Banff. Other places that may be mentioned are the "Angel Glacier" at the foot of Mt. Edith Cavell, the Athabasca Falls, Maligne Lake, and Pyramid Mountain. Wild game can often be viewed at close range, from the lordly moose to the marten, mink and humble coney, with a generous sprinkling between of that prince of panhandlers, the brown bear.

Botanists and lovers of flowers will be in their paradise. It is interesting to note that flowers characteristic of the different seasons can be found at Jasper at the same time. At the tree level spring flowers may be found in June, while at the Lodge summer flowers prevail. One is struck by the size and brilliant colouring of some of these. The list of varieties is long and reminds one of a florist's catalogue. It may be permitted to mention some few—the Indian Paint Brush, Wild Roses, Alpine Poppies, Blue Larkspur, Red and White Wintergreen, Cavell Flower, Harebells, Gaillardias, Mountain Orchids and Mountain Daisies—something for every fancy! Surely, there is every allure at Jasper Park!

Hic dies vere mihi festus
Atras eximet curas. . . . . Horace.

A.G.N.

THE EVALUATION OF PREPARATIONS OF THE VITAMIN B-COMPLEX*

BY L. B. PETT, M.A., PH.D., F.C.I.C.,† J. A. MCKIRDY, B.SC.‡ AND M. M. CANTOR, B.SC., M.D., F.A.C.P.

Edmonton

THE assessment of the physiological and clinical value of commercial vitamin preparations is of great practical importance to manufacturers, physicians and public alike. It is, however, far from being a routine matter, especially with regard to multiple vitamin preparations.

The problem considered here concerns the relative values of six commercial vitamin B-complex preparations. As is well-known the B-complex consists of several definite organic chemicals such as thiamine, riboflavin, pyridoxine, pantothenic acid, nicotinic acid, biotin, and inositol, together with other active factors not yet chemically identified. The B-complex is thus a multiple vitamin preparation whose physiological and clinical value is probably dependent on the relative amounts of the individual constituents.

Sources of the B-complex used in making commercial preparations include yeast, liver and rice bran, each of which contains the components of the B-complex in a different proportion. Frequently also the natural products from the above sources are "fortified" especially with thiamine and nicotinic acid.

No purpose would be served by reviewing here the voluminous literature on the vitamin B-complex, both chemical and clinical. No similar study has been reported so far as we have found, and it is not our desire to enter into the many ramifications of the subject at this point.

MATERIALS AND METHODS

The animals used were Wistar rats of a strain long bred in our laboratory. These, taken at weaning, averaged about 40 gm. per rat. Ten rats (5 male, 5 female) were placed in each of 15 cages, under circumstances rendering coprophagy difficult. Each rat was fed every day the designated amount of B-complex preparation. They all had water and B-free diet *ad lib.* Each group was weighed thrice weekly for the test period of 22 weeks. These weights were divided by the number of rats in the group at the time of weighing, to give the weight per average rat. A protocol of the experiment was kept, which included changes in the outward appearance of the rats, dates on which casualties were found, and autopsy reports. Autopsies were performed on all casualties except in the case of a few animals which died in the night and were mostly eaten before the morning.

The vitamin B-free diet (Smaco) has the following composition: sucrose 68 per cent, vitamin-free casein 18 per cent, vegetable oil 8 per cent, U.S.P. salt mixture No. 2, 4 per cent, U.S.P. cod liver oil 2 per cent. The salt mixture consists of sodium chloride 1.73 gm., magnesium sulfate 5.45 gm., sodium acid phosphate 3.47 gm., potassium acid phosphate 9.54 gm., calcium acid phosphate 5.40 gm., ferric citrate 1.18 gm. and calcium lactate 13.00 gm. The sodium chloride content of the diet was 0.174 per cent.

Six commercial preparations of the vitamin B-complex, purchased in a drugstore, were used. Their composition, calculated from information on the labels, is shown in Table I. This Table also shows the doses recommended on the labels, and at the bottom, the average daily human requirements of these vitamins. It may be noted at once that the recommended dose supplies in some cases, many times a day's requirements of one constituent, but barely enough of some other member of the B-complex.

The natural sources of these preparations were as follows: A, yeast; B, yeast; C, liver; D, yeast; E, liver; and F, rice bran.

Plan of experiment.—Since thiamine has received more emphasis clinically than other members of the B-complex, it was decided to use each preparation in such a quantity that the thiamine intake of all groups was the same. By equating the thiamine intake, the emphasis is placed on the other members of the B-com-

* From the Department of Biochemistry, University of Alberta, Edmonton.
† Lecturer in Biochemistry, now Director, Division of Nutritional Services, Ottawa.
‡ Research Assistant.

plex. Four international units of thiamine per rat per day is considered adequate, so this intake was used for the first 6 groups of rats. Since lessening the amount of thiamine to a critical level might show up differences in other members of the complex, a further 6 groups of rats were started on a daily intake of 2 international units per rat, and a further 3 groups on a daily intake of only 1 international unit per rat.

Three methods of comparing the results may be used: (1) a consideration of the growth curves, and the growth attained; (2) comparing the growth rates, that is, total gain in weight divided by the 22 weeks of the experiment; and (3) the number of rats that survived. The results are presented in these three ways, Graphs 1, 2, 3, showing the growth curves, and Table II the growth rate and survivals, compared with the actual intake of each component of the B-complex.

RESULTS

Graph 1 gives the average growth curves obtained when each rat received 4 international units of thiamine daily. The differences are then due to other components of the B-complex, which vary in relative amounts in each of the 6 preparations used. These variations are shown in Table II.

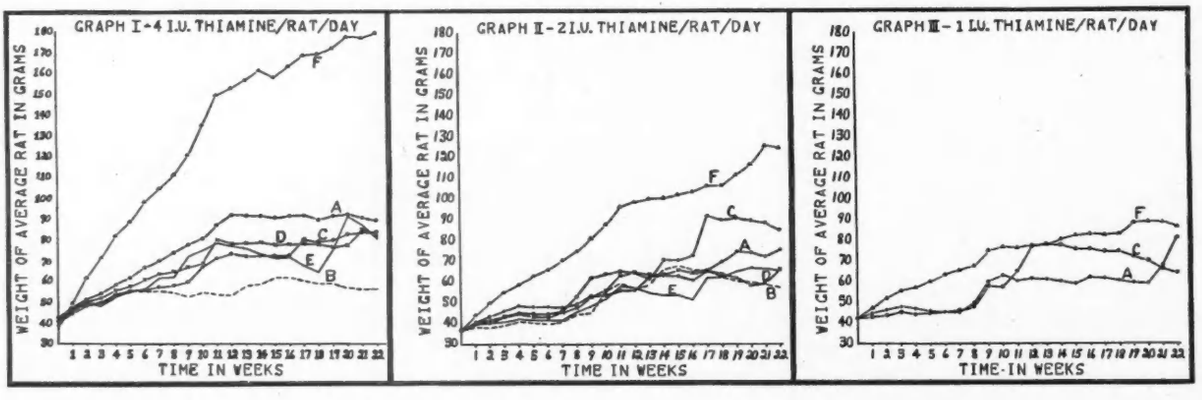
TABLE I.

SHOWING THE RELATIVE COMPOSITIONS OF THE SIX COMMERCIAL PREPARATIONS USED, THE DOSES RECOMMENDED ON THE LABELS, COMPARED WITH AVERAGE HUMAN DAILY REQUIREMENTS

Preparation	*Micrograms per 1 c.c. or 1 tablet of*					*Dose recommended on Label*
	Thiamine	*Riboflavin*	*Pyridoxine*	*Pantothenic acid*	*Nicotinic acid*	
A—1 c.c.	300	120	50	*100	1,200	8 c.c.—adults.
B—1 tablet	3,300	150	150	*275	8,370	3 tablets/day.
C—1 c.c.	375	150	50	280	*1,437	8 c.c.—adults.
D—1 tablet	1,500	500	100	184	4,000	3 tablets/day.
E—1 capsule	600	100	+	+	+	1 capsule/day.
F—1 c.c.	125	100	50	130	625	Only as per prescription (8 c.c.).
Average daily requirement	1,500	1,500	750?	1,500?	20,000	

1 I.U. of Thiamine = 3 micrograms (0.003 mg.).
1 Sherman-Bourquin Unit of Riboflavin = 2.5 micrograms.
*Not stated on label.

Graph 2 gives the average growth curves obtained when each rat received 2 international units of thiamine daily. This amount is not quite enough for maximum growth, and by putting the animals in a critical condition brings out other differences resulting from other components of the B-complex.



Graph 3 gives the average growth curves found when each rat received only 1 international unit of thiamine daily.

A more convenient and accurate comparison may be made on the basis of the rate of gain in weight over the 22 weeks' duration of the

experiment and the number of survivors in each group. This information, together with comparative analyses of the 6 preparations used, is given in Table II.

DISCUSSION

From the graphs and the Table it is striking that one commercial preparation of vitamin B-complex (F) has given outstandingly better results than any of the others. Of these others, figures, that the differences among the various preparations shown in Graph 1, are due to differences in riboflavin content.

Riboflavin content is not the final answer, however. From Graph 2, and the second group in Table II, in which the thiamine intake was 2 international units per rat per day, it is clear that some other factor is playing a part, both on survival and on growth rate. For instance Preparation D was supplying twice as much

TABLE II.

COMPARISON OF GROWTH RATES WITH THE AMOUNTS OF VITAMIN B-COMPLEX FACTORS RECEIVED

Group Number	*Preparation*	*Micrograms received per rat per day of:*					*Results after 22 weeks*	
		Thiamine	*Riboflavin*	*Pyridoxine*	*Pantothenic acid*	*Nicotinic acid*	*Rate of gain gm./week*	*Survivors out of 10*
1 – 4	A	12.0 (4 I.U.)	4.8	2.0	4.0*	48.0	2.17	6
2 – 4	B	12.0	0.54	0.54	1.0*	30.4	0.68	1
3 – 4	C	12.0	4.8	1.6	9.0	46.0*	1.95	5
4 – 4	D	12.0	4.0	0.8	1.5	32.0	1.84	3
5 – 4	E	12.0	2.0	+	+	+	1.79	2
6 – 4	F	12.0	9.6	4.8	12.5	60.0	6.39	9†
1 – 2	A	6.0	2.4	1.0	2.0*	24.0	1.76	2
2 – 2	B	6.0	0.27	0.27	0.5*	15.2	0.91	2
3 – 2	C	6.0	2.4	0.8	4.5	23.0*	2.19	2
4 – 2	D	6.0	2.0	0.4	0.75	16.0	1.35	1
5 – 2	E	6.0	1.0	+	+	+	1.30	1
6 – 2	F	6.0	4.8	2.4	6.2	30.0	3.97	6
1 – 1	A	3.0	1.2	0.5	1.0*	12.0	1.76	1
3 – 1	C	3.0	1.2	0.4	2.2	11.5	0.99	1
6 – 1	F	3.0	2.4	1.2	3.1	15.0	1.99	7

*Calculated. †One death from congenital defect.

A was best and B poorest in this test. Since F is the only preparation using rice bran as a natural source of the B-complex, it might be assumed that this fact contributes to its superiority. However, this preparation contains added thiamine and riboflavin, which would influence the results.

Comparing Graph 2 with Graph 1, it will be noted that reducing the thiamine intake to a critical level has produced a change in the relative positions of the 6 preparations, C now being well above A, though lower than F.

More precise comparisons may be made from the table. Considering only the first set of 6 in which each rat received 4 international units of thiamine daily, the difference in rate of gain, and the number of survivors closely parallels the amount of riboflavin received. This correlation is better than can be made with any of the other components of the vitamin B-complex. It may be assumed, therefore, from these riboflavin as E, but the average gain was the same in each case. The important factor is not nicotinic acid, in view of the results with A, C and F. There remain pyridoxine, pantothenic acid and less known components. Consideration of the bottom group of 3 shows an average gain definitely not in proportion to the ratios of pantothenic acid, though it might be correlated with nicotinic acid, which was previously eliminated. While comparison is difficult, the results show that at different levels of thiamine intake, the importance of other components of the B-complex may vary.

The arbitrary choice of thiamine as the basis for feeding the different preparations places at a disadvantage a preparation, such as B, containing large amounts of added thiamine. Had the preparations been fed, for example, on an equal riboflavin basis, the results would likely have been different. It should be emphasized, therefore, that our results do not warrant con-

clusions about the relative physiological values of the preparations, except on an equal thiamine basis.

As already pointed out, some of these preparations contain thiamine or nicotinic acid grossly in excess of the other constituents of the B-complex. Furthermore, some of the labels recommend quantities supplying many times the daily human requirements of some components, and scarcely a day's needs of others. If the purpose is to treat a condition with, for example, thiamine, in massive doses, then it might be better to use thiamine alone, and not to suggest that other members of the B-complex are in a reasonable ratio to the thiamine. On the other hand if the purpose of such a preparation is to use the whole B-complex in treatment, then obviously the analysis bears no relation to usually accepted relative requirements. The work reported here emphasizes the importance of a suitable ratio of components, since equal thiamine intake was not good enough in the presence of unequal amounts of other components.

SUMMARY

1. Six commercial preparations of the vitamin B-complex have been compared by feeding groups of rats a B-free diet supplemented by the B-complex preparations so that the thiamine (B_1) intake was uniform in all groups.

2. The best results came from using a preparation having the following proportion among known members of the vitamin B-complex: thiamine 1.0, riboflavin 0.8, pyridoxine 0.4, pantothenic acid 1.0, nicotinic acid 5.0.

3. The poorest results were obtained, using a preparation having the following proportion among the components: thiamine 1.0, riboflavin 0.05, pyridoxine 0.05, pantothenic acid 0.1, nicotinic acid 2.5.

4. These results emphasize the importance of having adequate amounts of all the B_2-complex along with thiamine. The gross disproportion among these components observed in some commercial preparations apparently resulted from adding such synthetics as thiamine or nicotinic acid to the original source material.

5. At different levels of thiamine intake the relative importance of the components of the B_2-complex changed. Thus, with higher amounts of thiamine, the riboflavin content was of greatest importance, while with smaller quantities of thiamine, the pyridoxine and nicotinic acid content seemed to be more important than that of riboflavin.

The authors are indebted to Professor G. Hunter for helpful advice and valuable criticism. The technical assistance of Mr. Robert Clelland, who cared for the experimental animals is gratefully acknowledged.

RÉSUMÉ

Une expérience assez originale a été faite avec 6 préparations commerciales du complexe vitaminique B. On a soumis des groupes de rats à un régime dépourvu de B mais supplémenté par les préparations de Complexe B administrées de telle sorte que B_1 fut donné à dose uniforme pour chaque préparation. Les meilleurs résultats ont été obtenus avec la préparation dont les proportions du complexe B étaient les suivantes: thiamine 1.0, riboflavine 0.8, pyridoxine 0.4, acide pantothénique 1.0, acide nicotinique 5.0.

Ces résultats démontrent l'importance de la distribution adéquate des divers représentants du complexe B. Si la proportion de thiamine augmente, celle de la riboflavine devient la plus importante; si la thiamine est moins bien représentée, la proportion de pyridoxine et d'acide nicotinique est plus importante que celle de la riboflavine.

JEAN SAUCIER

As we study school health programs we are amazed to find the variations that exist. One city spends thousands of dollars on improving pupils' posture but conducts no tuberculosis case find program, while a neighbouring city does nothing about posture but does extensive testing with tuberculin. In a similar manner some schools spend considerable sums on smallpox vaccination and diphtheria immunization while others feel that schools should not be concerned with these matters. Health instruction in some schools is limited to elementary grade pupils, and the failure to develop high school health education means that pupils graduate with little or no scientific information concerning the maintenance of health and the prevention of disease. These extreme variations are the direct results of inadequate planning and the absence of clearcut statements of what schools should and should not do in the field of health. —*J. Am. M. Ass.*, 1941, **117**: 342.

SHOCK*

BY PAUL G. WEIL

Montreal

II.

CONDITIONS USUALLY ACCOMPANIED BY HÆMOCONCENTRATION (CONCLUDED)

DEHYDRATION SHOCK.—A reduction in blood volume due to a decrease in the electrolyte and water content of the blood plasma is frequently seen in conditions of dehydration.[11, 17] Body water and electrolytes are distributed in two compartments, the extracellular and the intracellular. The extracellular fluids include (*a*) that contained in the plasma of the blood and (*b*) the interstitial fluid lying between the vascular compartment and the tissue cells. The chemical composition of interstitial fluid is almost identical with that of blood plasma; the principal difference is the greater amount of protein in plasma per unit volume as compared with interstitial fluid. The quantity of the interstitial fluid is about three times as great as the quantity of blood plasma.

The mechanics of the circulation of the blood make maintenance of a stationary volume in the vascular compartment of much more importance than in the interstitial space. (The quantity of blood in the vascular system is one of the five factors which combine to maintain the normal arterial blood pressure). An increase in volume of extracellular fluid therefore results in first an expansion of interstitial space (œdema) and conversely a decrease in extracellular fluid (dehydration) results in first a diminution of interstitial fluid. The device by which fluid is shifted within the extracellular compartments from intravascular to interstitial spaces or in the reverse direction is, by virtue of their osmotic pressure, the plasma proteins; there is also the direct return of lymph to the blood. The capacity of the interstitial compartment exhibits a wide adjustment in defence of blood plasma as shown by the fact that behind the plasma there is a reserve of fluid three times as large as the volume of the plasma. But once this reserve has been exhausted then blood plasma is called upon to give up its water and electrolytes.[5, 11] When such a condition is present, hæmoconcentration will also be present.[18]

A loss of extracellular fluid is most frequently the result of failure of reabsorption of gastrointestinal secretions (vomiting, diarrhœa, gastrocolic fistula, cæcostomy, etc.), excessive sweating, and the increased renal excretion of salt and water in Addison's disease. It is in such conditions as these that hæmoconcentration is a pre-condition of shock,[2, 15] for if a person with an already reduced blood volume be subjected to a surgical operation or trauma, the loss of even a small amount of blood further reduces blood volume and may precipitate shock.

The development of shock in such cases is dependent then on at least two factors: (1) the sudden further depletion of an already existing reduced blood volume and (2) the inability to readjust this deficiency by dilution of the blood because of the exhaustion of the extracellular fluid stores. Dehydration shock, therefore, is characterized by a reduction in blood volume due to a loss of the electrolyte and water of the blood plasma and interstitial tissues. The resultant hæmoconcentration differs from the hæmoconcentration of burns as previously mentioned in that in dehydration shock there is not only an increase of erythrocytes per unit volume of whole blood but also an increase of plasma protein per unit volume of plasma.

A condition which frequently leads to shock is intestinal obstruction. The reduced blood volume of this condition is due to several factors: (1) the loss of extracellular fluid through vomiting and (2) the loss of plasma at the site of the obstruction.[9, 13] The hæmoconcentration present in cases of intestinal obstruction may be characterized by an increase of erythrocytes per unit volume of whole blood without any marked change in the plasma protein per unit volume of plasma as in burns, or by a relative increase in both erythrocytes and plasma protein as in cases of diarrhœa, Addison's disease, etc., depending on the severity of the vomiting and the plasma loss, as shown in Cases 8 and 9, Charts 1 and 2.

* McGill University Clinic, Royal Victoria Hospital, Montreal, Canada.

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The diagnosis of such conditions as those already considered and the evaluation of the status of the various blood constituents may best be made by the combined use of instruments for the determination of hæmoconcentration and plasma protein concentration.[6, 19, 20] Hæmoconcentration studies reveal the relative increase in erythrocytes or conversely the relative decrease in plasma and are therefore indirect determinations of blood volume. Plasma protein concentration studies give further information by indicating whether a reduced blood volume is due to loss of plasma or loss of water and electrolytes. The Evelyn photoelectric colorimeter for the determination of hæmoglobin,[8] and the falling drop apparatus for the estimation of plasma proteins[20] have been used in the investigation of the cases on which this series of articles is based. These instruments are recommended for their accuracy, simplicity, and for the rapidity with which by their combined use they aid in the prevention, diagnosis and treatment of the various forms of shock.

The treatment of dehydration shock should be twofold: (1) the prevention of dehydration especially in those who may be subjected to conditions that cause reduction in blood volume through blood loss such as surgical operation, and exposure to trauma; and (2) the immediate restoration once shock has developed, of blood volume by replacement of that which has been lost, *e.g.*, physiological saline solution and blood. Since, however, the amount of whole blood lost is usually minimal compared with the amount of water and electrolytes lost, an excellent form of therapy is plasma or serum diluted with an equal volume of physiological saline solution.

In intestinal obstruction, in which condition there may be considerable loss of plasma and depletion of extracellular fluid stores, plasma or serum diluted with saline in amounts depending on the severity of the vomiting is the ideal treatment.

CONDITIONS USUALLY ACCOMPANIED BY HÆMODILUTION

Surgical shock. — The importance of neurogenic factors such as the reflex stimulation arising from traction on the mesentery in abdominal operations, and the occasional action of the drugs allied to cocaine used in spinal anæsthesia in causing dilatation of vascular segments, is well known. Although opinion differs as to whether the vascular dilatation following spinal anæsthesia is arterial[14, 21] or venous[22] it is generally agreed that shock following spinal anæsthesia is the result of a reduction in *effective* blood volume due to an increase in the size of the vascular system without any *actual* reduction in blood volume. Such a condition is usually referred to as *primary shock.*[2, 15] Because of the mechanism involved in the production of primary shock it is accompanied by neither hæmoconcentration nor hæmodilution, as shown in Case 10, Chart 3.

Although the rôle of anæsthesia in the causation of surgical shock is well known, the importance of the rôle of hæmorrhage in the development of surgical shock is not so well recognized.[2, 15, 17] The form of shock in which hæmorrhage is herein considered to be the predominant causative factor is that usually referred to as *secondary shock.* It is the form of surgical shock that most frequently occurs.

There is a greater loss of blood during many surgical operations than is generally realized. It has been reported[3, 4, 12] that the blood loss at operation as determined by the hæmoglobin content of the swabs, towels, sheets, etc., used during an operation may amount to as much as 600 to 1,200 c.c., despite the impression of the operator that there was not much blood lost during the operation.

The significant rôle played by hæmorrhage in the development of surgical shock is further shown by an analysis of three recent publications.[7, 16, 23] In one[23] blood changes following controlled hæmorrhage (venesection) are reported. In order to compare the findings of this report with those of the two subsequent ones, Table IA has been prepared from the data contained in the first report. The second publication also reports blood changes following controlled hæmorrhage.[7] Table IB has been prepared from the data contained in the second report. As shown by Table IC, twenty-four hours after the removal of an average amount of 960 c.c. of blood from each subject, the average fall in hæmoglobin level as compared with the pre-hæmorrhage level was 18 per cent for the two groups. In the third report,[16] hæmatocrit values are given for 19 patients both before and twenty-four hours after operation for cancer of the breast performed under ether anæsthesia.

Table II has been prepared from the data for hæmatocrit values given in the third publication, and from the data for hæmoglobin changes and

amount of blood removed shown in Table I. It will be seen from Table II that the average decrease of 15 per cent in the hæmatocrit level twenty-four hours after operation, on the basis of the values shown in Table I, represents a loss of 800 c.c. of blood at operation. It is of interest, furthermore, that of the 19 patients, twelve showed symptoms of shock including a fall of blood pressure to low levels during operation, and of these twelve, four developed signs and symptoms of shock after operation.

In view of these findings and the observations that the same sort of blood findings (hæmodilution) and clinical condition (shock) may occur after surgical operations in which there is a recognized hæmorrhage at operation, and even after hæmorrhage not associated with surgical procedures,[7, 23] the rôle of blood loss in the causation of surgical shock must be considered important as shown by Cases 11, 12, 13 (Charts 4, 5, 6). It may very well be that neurogenic, and possibly even toxic, factors such as histamine, potassium, etc., are responsible for certain cases of secondary surgical shock, and that even in those cases in which shock develops after hæmorrhage during operation, such factors may be contributory to the development of shock. These considerations, however, do not minimize the importance of blood loss in the causation of many cases of surgical shock.

The development of shock following hæmorrhage during surgical operation may depend in part on whether or not there is an available store of extracellular fluid which can be mobilized in the physiological response to hæmorrhage. The occurrence of shock following blood loss at operation probably also depends not only on the amount but on the rate of blood loss. Still another determining factor in the occurrence of surgical shock from hæmorrhage is the apparent individual variation in the response to a sudden reduction in blood volume, for in some cases hæmodilution is almost immediately manifest, in others it is more delayed.

The treatment of surgical shock is based on the theory that the mechanism of the development of surgical shock is a reduction of blood volume. Treatment which consists of the immediate and complete restoration of blood volume is highly successful. The restoration of blood volume is best achieved by the use of blood or the blood substitutes, plasma or serum. Such treatment which anticipates and augments the normal response to a reduction in blood volume is a marked achievement over the physiological mechanism, in that blood volume is thereby restored more rapidly and more effectively because of the immediate replacement of adequate amounts of fluids of a higher protein content than extracellular fluids.

The choice of blood or a blood substitute, such as plasma or serum, will depend on whether or not there has been considerable loss of whole blood at operation. Saline, except in those cases where there is obvious dehydration and in which the development of shock may be considered to be due at least in part to this fact for the reasons already discussed, is usually only of temporary benefit, because it may not be retained long enough within the vascular system to maintain effectively restored blood volume. Whole blood is to be preferred in cases where there has been much blood loss for the reason that in such cases the sudden reduction in oxygen-carrying capacity may be contributory to the pathological effects of a sudden reduction in blood volume.

Adrenalin, ephedrine and similarly acting drugs are useful in surgical shock due to the effects of spinal anæsthesia (primary shock); they are generally considered useless and by some even harmful[1, 10, 15] in the various forms of shock due to an actual reduction in blood volume as in surgical shock following hæmorrhage (secondary shock).

CONCLUSIONS (PART II.)

The hæmoconcentration of conditions associated with a loss of extracellular fluid is characterized by a relative increase in erythrocytes and plasma protein, except in intestinal obstruction, in which condition because of the loss of plasma the hæmoconcentration may be characterized by a relative increase in erythrocytes only. Adequate extracellular fluid stores are important in the prevention of shock by reason of the dependence of normal blood volume in part on the electrolyte and water content of the plasma. The treatment of dehydration shock is based on the recognition of the factors involved in the mechanism of the reduced blood volume, *i.e.*, the restoration of blood volume by replacement of that which has been lost, electrolytes and water, plasma, or blood in the proper proportions.

In general two kinds of surgical shock are recognized, *primary* and *secondary*. Primary shock is due to neurogenic factors, such as the

dilatation of vascular segments following spinal anæsthesia. In such cases there is a reduction in *effective* blood volume as a result of a sudden increase in size of the vascular system. Neither hæmoconcentration nor hæmodilution is present in this type of shock. Surgical shock due to hæmorrhage attending operation, herein referred to as secondary shock, is characterized by an *actual* reduction in blood volume as a result of the loss of blood. Hæmodilution is invariably present in this type of shock. The degree of hæmodilution varies according to the amount of blood lost, the state of hydration of the patient, the time of blood sampling after operation, etc. The treatment of surgical shock, particularly secondary shock, is the restoration and maintenance of blood volume by whole blood or blood substitutes. Adrenalin and similarly acting drugs are useful in primary shock but not in secondary shock. In cases of secondary shock in which there has been considerable blood loss, whole blood is the best transfusion fluid.

TABLE I.

	Number of subjects	*Average reduction in Hgb. (Ht.) per cent in each subject 24 hrs. after venesection*	*Average actual amount of blood in c.c. removed from each subject*
A	14	19	950
B	6	17	970
		(Average reduction in Hgb. per cent of groups A and B)	
C		18	960

TABLE II.

Number of patients	*Average reduction in Ht. (Hgb.) per cent in each patient 24 hours after operation*	*Average calculated amount of blood in c.c. lost at operation*
19	15	800

CASE 8

Chart 1, male, age 40, (114, 754). Patient was admitted with severe upper abdominal pain which had been present for the previous 26 hours, with intermittent vomiting for 12 hours prior to admission. He was in profound shock at the time of admission with a bluish-gray colour, cold clammy skin, blood pressure and pulse unobtainable, temperature 100°, respiration 30. A diagnosis of perforated peptic ulcer was made because of the history of epigastric distress and pain relieved by food and alkali, the nature of the complaints, physical findings of rigid abdominal wall and x-ray findings of free gas in peritoneal cavity.

A blood sample obtained on admission with great difficulty because of the collapsed state of the veins and increased viscosity of the blood showed a hæmoglobin of 130 per cent indicating marked hæmoconcentration. He was given 150 c.c. of serum (50 c.c. of 3 times concentrated serum reconstituted to normal with physiological saline solution) plus 500 c.c. of normal saline. This small amount of fluid had no effect on the hæmoconcentration as shown by a hæmoglobin of 128 per cent three hours after admission.

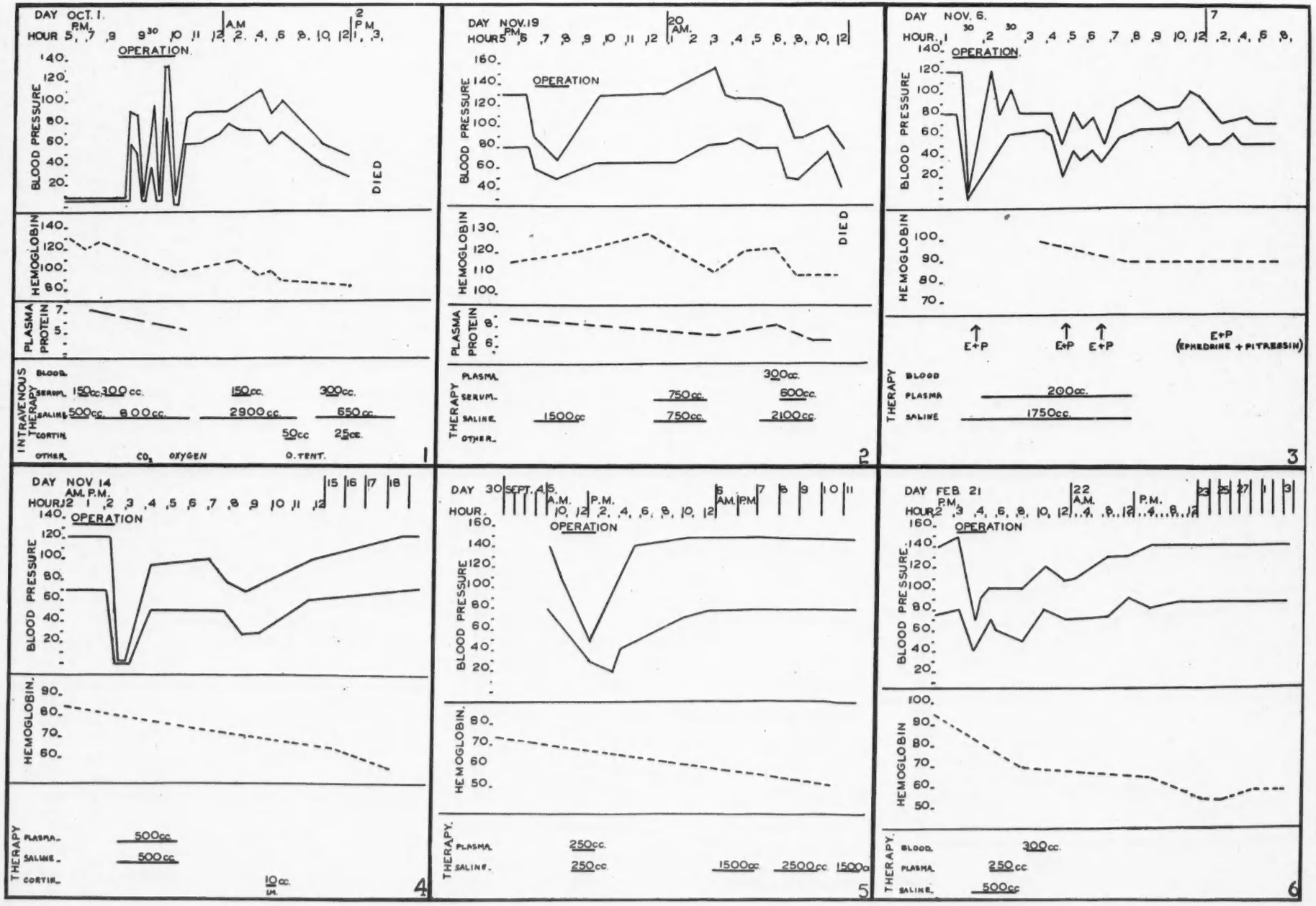
Operation was performed under oxygen and ether anæsthesia. The blood pressure became obtainable for the first time simultaneously with opening of the peritoneum. Approximately 2,500 c.c. of dark coloured fluid filled the peritoneal cavity. A perforated duodenal ulcer was found and sutured. During the operation a continuous infusion of 300 c.c. of serum (100 c.c. of 3 times concentrated serum reconstituted to normal with physiological saline solution) plus 800 c.c. of normal saline was given. At the close of the operation and the end of the infusion the hæmoglobin was 100 per cent, showing that hæmoconcentration had been corrected by the infusion. The patient's condition after his return to the ward following operation was greatly improved; his colour was good and his blood pressure remained at 100/75 for several hours. Despite the infusion of more serum and saline, which controlled the hæmoconcentration, his condition became worse and he died 24 hours after admission.

Autopsy.—There was evidence of acute generalized fibrino-purulent peritonitis. The abdomen contained large amounts of dark-coloured fluid of specific gravity 1.015. There were areas of petechial hæmorrhages throughout the small and large intestine. There was passive hyperæmia and œdema of lungs, kidneys and other parenchymatous organs. The pleural cavities contained about 2,000 c.c. of blood tinged fluid of specific gravity 1.012. Culture obtained from peritoneal fluid showed pneumococci.

This case shows several things of interest: (1) Shock with hæmoconcentration in which the hæmoconcentration was characterized by a loss of plasma, as shown by a normal plasma protein value of 7.3 per cent. The loss of plasma may be accounted for by the large peritoneal exudate of specific gravity of 1.015. (2) Shock was probably accentuated by the effect of the large volume of peritoneal fluid in causing decreased venous return to the heart, by reason of both the increase in intra-abdominal pressure and curtailment of diaphragmatic excursions, as shown by the effect on blood pressure of release of the intra-abdominal pressure. (3) The ineffectiveness of repeated small transfusions of plasma or serum in such cases for a hæmoglobin of 130 per cent with normal concentration of plasma proteins on admission indicated a decrease in blood volume of approximately 30 per cent due almost entirely to loss of plasma. In a person of average size the amount of normal plasma or serum that would have to be given to replace such a loss would be at least 1,200 c.c. The large amounts of saline used were ineffective.

CASE 9

Chart 2, male, age 45, (115, 386). Patient was admitted with the history of a sudden onset of crampy abdominal pain which had been present for the previous 8 hours and persistent vomiting for about 6 hours prior to admission. He was acutely ill at the time of examination shortly after admission, in a semi-comatose condition with a cold, clammy skin, temperature 97°, pulse 78, respiration 24, blood pressure 130/80, and vomiting


DAY OCT. 1.
HOUR
OPERATION
BLOOD PRESSURE
DIED
HEMOGLOBIN
PLASMA PROTEIN
INTRAVENOUS THERAPY
BLOOD
SERUM 150cc. 300 cc. 150cc. 300cc.
SALINE 500cc. 800cc. 2900 cc. 650 cc.
CORTIN 50cc 25cc.
OTHER CO2 OXYGEN O. TENT.
1
DAY NOV. 19
OPERATION
DIED
PLASMA 300cc.
SERUM 750cc. 600cc.
SALINE 1500cc 750cc. 2100cc.
2
DAY NOV. 6.
OPERATION
E+P
E+P E+P
E+P (EPHEDRINE + PITRESSIN)
BLOOD
PLASMA 200cc.
SALINE 1750cc.
3
DAY NOV 14
OPERATION
PLASMA 500cc.
SALINE 500cc
CORTIN 10cc.
4
DAY 30 SEPT. 4 5.
OPERATION
PLASMA 250cc.
SALINE 250cc. 1500cc 2500cc 1500cc
5
DAY FEB 21
OPERATION
BLOOD 300cc.
PLASMA 250cc
SALINE 500cc
6

almost incessantly. Examination of the abdomen revealed a mass in the right groin, which the patient said he had had for several years and which up to the time of the present illness had always been reducible. A diagnosis of strangulated hernia was made and the patient was operated upon under spinal pontocaine anæsthesia.

At operation, a strangulated hernia was found, which was reduced. Because of the presence of a semipurulent exudate (specific gravity 1.020) in the peritoneal cavity a culture was taken and the entire length of the small and large bowel explored for a perforation. Although the bowel in the region of the strangulation was reddened, no perforation was found. The appendix, stomach and duodenum were normal and no evidence of diverticulitis was present. No bacterial growth was obtained from the culture.

A blood sample obtained before operation showed a hæmoglobin of 115 per cent and plasma proteins of 8.7 per cent, indicating hæmoconcentration due to loss of extracellular fluid. He was given continuous saline during operation, despite which he went into shock, from which he recovered after operation. The hæmoglobin which had been 111 per cent immediately after operation, was 125 per cent four hours later and the plasma proteins were 7.7 per cent, indicating a loss of plasma. He was then given 750 c.c. of serum (250 c.c. of three times concentrated serum reconstituted to normal with physiological saline solution) plus 750 c.c. of saline. His hæmoglobin at the end of the infusion was 112 per cent, plasma proteins 7.2 per cent. Vomiting again occurred and diarrhœa developed. Another blood specimen, taken three hours later, revealed an increased hæmoconcentration and plasma protein concentration as shown by a hæmoglobin of 124 per cent and plasma proteins of 8.2 per cent. Although the hæmoconcentration was controlled by another infusion of 600 c.c. of serum, 300 c.c. of plasma, and 2,100 c.c. of saline, as shown by a hæmoglobin of 110 per cent and plasma protein of 6.8 his blood pressure declined and he died 20 hours after admission.

Autopsy.—Generalized serofibrinous peritonitis with free fluid, specific gravity 1.020, in abdominal cavity. The bowel was greatly dilated and there was an acute enteritis, involving the lower part of the jejunum and upper ileum, with numerous small superficial ulcerations. In the cæcum and the colon also there were numerous superficial ulcerations. The lungs showed marked passive hyperæmia and œdema.

This case shows: (1) The development of surgical shock in a person with an already reduced blood volume, as indicated by hæmoconcentration prior to operation. (2) The varying blood findings with regard to plasma protein concentration dependent on loss of plasma due to the obstruction and exudation, and loss of extracellular fluids through vomiting and diarrhœa. (3) The need of immediate restoration of blood volume, for it is conceivable that if the hæmoconcentration had been reduced to normal and maintained during the first few hours after admission the patient might have recovered.

CASE 10

Chart 3, male, age 32, (115, 148). The patient was admitted with the complaint of epigastric pain, weakness, nausea, vomiting for previous 3 months, and a history of several previous admissions for treatment of duodenal ulcer. Seven years previously he had had a posterior gastro-enterostomy performed for pyloric obstruction. Two years before he had been operated upon for perforation of a stoma ulcer. One year before he had had an operation of resection of the gastroenterostomy for recurring ulcers. Examination revealed a poorly nourished, pale man with blood pressure of 118/75, hæmoglobin 90 per cent.

It was decided on the present admission to perform a gastrectomy. The patient was given spinal nupercaine anæsthetic and within a few minutes he went into shock with pallor, sweating and unobtainable blood pressure. He was given saline and ephedrine with pitressin intravenously, following which his blood pressure returned to normal. He was then given serum while his condition was improving. The operation was begun, but because of his poor condition it was decided to perform, instead of the proposed gastrectomy, an anterior gastroenterostomy as the simplest and most rapid operation and the only one under the circumstances which could be done to relieve his gastric retention. After the operation was finished and the patient was returned to the ward he again went into shock, which improved after he was given ephedrine and pitressin. His blood pressure remained low for several days but by the 4th day it had reached 110/80. He was discharged improved 17 days after operation.

It is of interest that on a previous occasion during operation for repair of a perforated ulcer under spinal pontocaine anæsthesia, he went into shock during operation, his blood pressure dropping from 125/85 to 70/54.

This is clearly a case of shock due to spinal anæsthetic, for the shock syndrome developed before operation was begun. The effectiveness of adrenalin-like drugs (ephedrine and pitressin) in shock due to spinal anæsthetic is shown by the rise in blood pressure following the use of ephedrine and pitressin both before and after operation.

CASE 11

Chart 4, female, age 33, (38972). This patient was admitted for repair of an incomplete sacro-pubic hernia with cystocœle, rectocœle, and partial prolapse. Physical examination apart from pelvic findings was normal; hæmoglobin 86 per cent, blood pressure 120/70. Operation which consisted of a Manchester repair, was performed under gas and ether. On her return to the ward, the patient went into shock. Her condition improved after the infusion of 1,000 c.c. of a solution of plasma mixed with an equal amount of physiological saline solution. She was discharged, improved, twenty days after admission.

This case, similarly to Case 12, is considered to be one of surgical shock due to hæmorrhage, for although it was the impression of the surgeon that there had not been much blood lost during operation, at least not enough to account for the development of shock, nevertheless, a decrease in hæmoglobin from 85 per cent before operation to 55 per cent four days after operation indicates, in the absence of post-operative hæmorrhage, a considerable amount of blood loss at operation.

Both this case and Case 12 illustrate (1) the rôle of hæmorrhage in causing surgical shock and (2) the error inherent in (*a*) the estima-

tion of blood loss during operation and (*b*) the consequent evaluation of the rôle of hæmorrhage in causing surgical shock on the basis of clinical impression unsupported by hæmoglobin determinations.

CASE 12

Chart 5, female, age 63, (41-5196). The patient was admitted with a diagnosis of carcinoma of the rectum. Except for poor nourishment and a mass in the rectum, physical examination showed normal findings, hæmoglobin 74 per cent, blood pressure 144/80. An abdomino-perineal resection was performed under spinal nupercaine anæsthesia. During operation the blood pressure fell to 50/30. The patient was given plasma and saline at the end of the operation, and saline on her return to the ward. Her condition gradually improved and she was discharged six weeks after the time of admission.

This case is considered to be one of surgical shock due to hæmorrhage, for, although no mention is made in the case report of either the development of shock or blood loss at operation, the chart shows that there was both shock, as indicated by a marked fall in blood pressure, and hæmorrhage, as indicated by a marked fall in the hæmoglobin from 74 per cent before operation to 50 per cent several days after operation. It is unlikely that the reduction in hæmoglobin was due to post-operative bleeding for no such explanation is given in the case report for the secondary anæmia which she was thought to have developed and which was successfully treated with blood transfusions before discharge from hospital. This case illustrates both the greater incidence of shock and the greater loss of whole blood at operation than is generally appreciated.

CASE 13

Chart 6, male, age 39, (42-2384). This patient was admitted to hospital with fracture of the femur. There was marked swelling in the region of the middle third of the femur which had been fractured and plated thirty years previously. The fracture was not compound. The patient was not in shock on admission.

At operation, which consisted of removal of old plates and insertion of new ones after reduction of the fracture under spinal pontocaine anæsthesia, there was considerable bleeding from large vessels at the site of the fixation of the old plates. The patient went into shock midway through the operation. He was treated with intravenous saline, neosynephrin and inhalation of oxygen and his condition improved. Toward the end of the operation he was given a plasma transfusion. A few hours after his return to the ward, following the completion of the operation, his systolic blood pressure began to fall, so he was given a blood transfusion. His blood pressure both systolic and diastolic then began to rise and his condition continued to improve. Recovery from then on was normal.

The amount of blood loss at operation is shown by the fall in hæmoglobin from 90 per cent preoperatively to between 55 and 65 per cent four and five days postoperatively. This fall represents a decrease in blood volume of about 30 per cent or approximately the loss of 2,000 c.c. of blood during operation.

This case illustrates: (1) The degree of hæmorrhage as shown by hæmodilution that may be associated with certain surgical procedures. (2) The rôle of hæmorrhage in causing surgical shock. (3) The value of hæmoglobin estimation in determining whether a case of surgical shock is due to hæmorrhage. Such determinations are valuable, not so much in the treatment of individual cases because marked hæmodilution may not, and usually does not occur rapidly, but rather in the evaluation of the rôle of hæmorrhage in cases of surgical shock in general. Once it is established by similar studies in the experience of others that hæmorrhage is a frequent cause of surgical shock the treatment of surgical shock will become largely preventive by the early use of blood and blood substitutes.

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THE COMMON NEUROLOGICAL SYNDROMES PRODUCED BY PRESSURE FROM EXTRUSION OF AN INTERVERTEBRAL DISC*

BY K. G. MCKENZIE AND E. H. BOTTERELL

Toronto

THE aphorism, "Man is as old as his arteries", applies almost equally well to other anatomical structures. In truth, man's intervertebral discs are among the first tissues to show the signs of wear and tear—the price he pays for assuming the upright posture.

Even at an early age man may become deformed or have pain because his intervertebral discs, either in part or as a whole, fail to function in absorbing the stresses and strains to which his back is subjected. Sometimes extrusion or bulging of a disc causes sufficient pressure on the spinal cord or nerves to produce neurological signs and symptoms. This paper will deal with these neurological syndromes. The subject, however, should be approached from the broad viewpoint of anatomy, physiology and pathology, and a realization that the neurological syndromes are but a part of this interesting new field of medicine.

The medical world is indebted to Schmorl, of Dresden, for his basic work on the pathology, anatomy and physiology of the spine and intervertebral discs. In 1930, O. A. Beadle,[1] under the auspices of the Medical Research Council, spent a year in Schmorl's laboratory, and subsequently published a most readable and comprehensive review and interpretation of Schmorl's work.

ANATOMY AND FUNCTION

The intervertebral disc, as the plastic unit in the spine, has the particular function of controlling the forces of flexion, extension, torsion pressure and mechanical shock. This unit is made up of three parts: the cartilage plates, the annulus fibrosus, the nucleus pulposus (Figs. 1 and 1a).

Cartilage plates.—The cartilage plates, approximately 1 mm. in thickness, cover the ends of the adjacent vertebral bodies. Marginally, the plates blend with the annular fibres and are firmly attached with these to the adjacent bone and longitudinal ligaments. Medially, the plates separate the nucleus from adjacent spongy bone. In early life the cartilage plate is pierced by blood vessels which supply the disc with nourishment during development. These vessels as well as the notochord from which the nucleus is formed become obliterated but may leave fissures or weak spots in the cartilage plate which predispose to herniation of the nucleus into the vertebral bodies. Schmorl found cartilage nodes in the vertebral bodies in 38 per cent of routine autopsies; singly or scattered. These herniations are usually of no clinical significance; their presence can be identified by routine x-ray examination which shows an area of increased calcification in the vertebral body adjacent to the herniation.

Annulus.—The annulus is made up of coarse fibroblastic bundles of tissue, which fade into the nucleus; laterally the bundles are strong and have a firm attachment outside the margins of the cartilage plates to the bodies of the vertebræ and posterior and longitudinal ligaments. "More recently, Roofe[2] (1940), using the technique described by Bodian (1936), has demonstrated copious nerve endings in the posterior annulus fibrosus and posterior longitudinal ligament. He did not observe specialized end-organs, but the type of terminal arborization would indicate that these are probably pain fibres." It is obvious that the annulus is weakest posteriorly just off centre, where the fibres end in the posterior common ligament. It is at this point that herniation of the nucleus almost invariably takes place, not laterally into the intervertebral foramen, because here the annulus is much stronger.

Nucleus pulposus.—The nucleus pulposus is confined by the cartilage plates above and below and marginally by the annulus fibrosus. It is soft and elastic and, normally, because of its inherent turgor, bulges when the disc is cut across. It has a high water content and transmits forces equally in all directions, thus

* From the Neuro-surgical Division, Department of Surgery, University of Toronto. Presented before the Canadian Medical Association in Winnipeg, June 25, 1941.

protecting adjacent bones, joints and ligaments from abnormal trauma. This function is lost in two well recognized ways: (*a*) When the cartilage plates and annulus fail to confine the nucleus in its normal position. (*b*) When the nucleus loses its inherent turgor because of some degenerative or ageing process.

PATHOLOGY AND FUNCTION

Throughout life the intervertebral discs show changes of structure. These changes may be due to: (*a*) age and degeneration; (*b*) developmental defects; (*c*) trauma; (*d*) infection and malignant disease.

(*a*) *Age and degeneration.* — Degenerative phenomena are so common at middle age that they may be regarded as a physiological ageing process in an organ subject to considerable functional activity. The discs become drier, lose their elasticity and spring and are no longer shock absorbers. Strain is thrown on the adjacent bone through ligament pull and osteophytes form. The x-ray appearance commonly known as osteo-arthritis of the spine is produced — a condition which probably has little to do with infective or toxic processes. Rather is it an attempt on the part of nature to stabilize that part of the spine that no longer has intervertebral discs functioning in a normal physiological manner. Such spines are obviously vulnerable and attacks of pain result because of strain on ligaments, articular facets and annulus. The rapidity and extent of this ageing process in the discs and the resulting changes in the spine vary considerably in different individuals. Generally speaking it may be considered as a natural rather than a disease phenomenon. Little can be done to prevent the process. The discs are probably among the first tissues to age and wear out.

(*b*) *Developmental defects.* — Developmental defects in a number of the cartilage plates due to imperfect disappearance and replacement of the notochord or blood vessels offer an explanation for adolescent kyphosis. Individual or scattered herniations through the cartilage plates are common x-ray findings (Schmorl's nodules). These individual or scattered herniations are of no special significance. The herniation becomes surrounded by dense new bone formation and the disc probably continues to function in a fairly normal manner. It is the new bone formation in the body about the herniation which is seen in the x-ray plates.

Developmental defects in the annulus are given no special mention in the literature. It seems likely that they do occur and in part at least explain the type of posterior extrusion which produces pressure on nerve roots or spinal cord.

(*c*) *Trauma.*—Some men and women end their natural days erect—a combination of good inheritance, good health and freedom from accident and prolonged trauma. In general it may be stated that degenerative changes are in the main the result of incessant wear and tear of functional activity. The severer grades of spinal deformity in later life are found prevailingly among hard workers.

Trauma plays a very definite and distinctive rôle in certain local lesions. Most often however, the trauma alone does not seem to be severe enough to rupture a normal disc. If one takes adjacent bodies and submits them to compression in a vise they will not rupture and permit escape of the nucleus. Twisting and pressure ultimately fracture and crush the bodies and permit escape of the nucleus into the fracture lines. This observation makes one feel that when there is an extrusion of nucleus or nucleus and annulus, there must have been some predisposing degeneration or developmental defect. When one considers the anatomical variations in the lower lumbar spine and sacrum it seems reasonable to postulate comparable variations in the make-up of the discs in this area. This might explain the frequency of single extrusions in the lower lumbar spine. Trauma alone or trauma plus degeneration does not seem to us to be a wholly adequate explanation. In 25 out of 50 definitely verified frank extrusions in the lower lumbar region, there was definite injury which precipitated the clinical syndrome.

In several of our younger patients with a diagnosis of posterior extrusion of the disc in the lower lumbar region, operation has disclosed an extruded loose piece of disc material with an attached sliver of bone. We have felt that in some of these patients an injury during the growing period interfered with the proper ossification of the rim of the body and a consequent imperfect anchorage of the annulus.

As an unusual example of injury and extrusion at a higher level the following case is of interest: A labourer, age 40, sustained an injury in the upper thoracic region from a falling tree ten years before. Two years later an

x-ray report described the change that can be seen today, namely, a marked narrowing of the disc space between three and four thoracic and a lateral scoliosis at this point. The patient worked and remained well until eight weeks ago when he rapidly over a period of weeks developed paralysis of the left leg and loss of pain and cold discrimination over the opposite side. There was no block in the cerebrospinal fluid pathway. Operation disclosed a piece of annulus, cartilage plate and bony rim of vertebral body which had pierced the dura and left antero-lateral quadrant of the cord. The specimen was detached and had to be removed from within the spinal cord.

(*d*) *Infection and malignant disease.*—In general it may be stated that the discs are seldom involved primarily in infectious or malignant processes. The absence of blood vessels in the three components of the disc acts as a barrier to infection and malignant cells. In tuberculosis the cartilage plates become eroded because of adjacent bone involvement—the discs bulge and give way into the bone. Thus x-ray evidence of loss of normal disc spacing may be an early sign of the disease in the adjacent bone. Eventually the disc is involved and replaced by bone in the healing process.

THE NEUROLOGICAL SYNDROMES

We have indicated that widespread degeneration and age processes are common. Various aches and pains result from these changes because the loss of disc function results in a spine that is ill adapted to stress and strain.

Posterior extrusions may impinge on spinal cord or nerves. These extrusions are rare in the cervical and thoracic regions, common in the two lowest lumbar discs.

THE CERVICAL AND THORACIC SYNDROMES

Extrusion of a disc in these situations is unusual when compared to the lower lumbar region. My personal experience has been limited to some eight or ten cases during the past fifteen years. In 1927, Stookey[3] brought together a group of cases, designated as ventral extradural cervical chondromas. In a more recent and very informative paper,[4] he has reviewed these cases under the diagnosis of herniation of the nucleus pulposus.

Fig. 2 shows varying situations of the lesion. In (*a*) and (*b*), the syndrome is that of a cord tumour, but with an outstanding difference, namely an absence of block in the cerebrospinal fluid pathway. This makes the lesion difficult to diagnose from some intrinsic lesion of the cord such as disseminated sclerosis. When there is a well established level exploration should be done. A reasonably early diagnosis or exploration is important, as extensive pressure or stretching of the cord by the lesion lessens the chance of a good result. In a patient I have operated upon the cord was stretched to a mere ribbon and no improvement followed removal of the lesion. In some of the other patients where paralysis was not complete, results have been satisfactory.

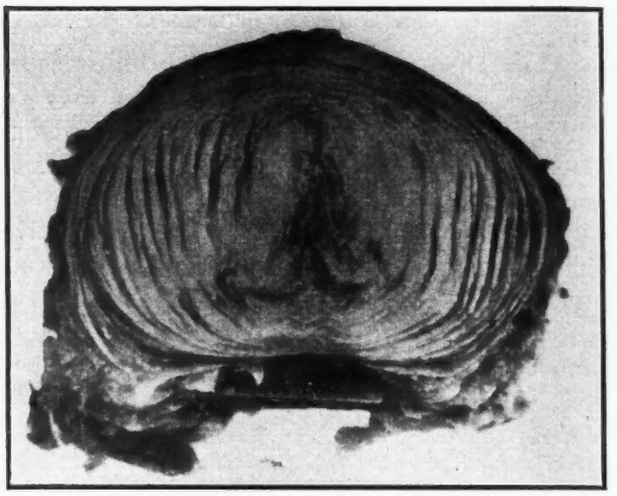


Fig. 1a.—Photograph of normal disc.

In the more laterally placed lesions (*c*), the cord escapes, here the signs and symptoms are those of motor and sensory root pressure. Stookey,[4] has pointed out the value of oblique x-rays of the cervical spine. In our experience this has been of great value in investigating patients with brachial neuritis. Calcification in an extruded disc or an osteophyte on the adjacent lip of the body can frequently be visualized. An unusual experience with five patients during this past year has exemplified the value of this x-ray technique and has also clarified, in my own mind at least, two cervical root syndromes. In these five patients the syndrome was as follows: (*a*) Between the sixth and seventh cervical vertebræ or the seventh cervical root—weakness of triceps and absent triceps jerk, with paræsthesia and pain over the radial side of hand. (b) Between the fifth and sixth cervical vertebræ or sixth cervical root—weakness of biceps and absence of biceps jerk, with paræs-

thesia and pain through the shoulder and over the radial side of the hand. Of these five patients two were traumatic and were verified by open operation. On the involved side the upper articular facet of the seventh was fractured and carried forward into the foramen. On the uninvolved side there was a complete dislocation. There could be no doubt about the localization of the lesion in these two patients.

In the other three, suffering from severe brachial neuritis, calcification could be visualized in the foramen corresponding to the neurological lesion. One patient was operated upon and the spur seen in the x-ray identified. Recovery from pain was immediate and dramatic. The other two patients made satisfactory recoveries with rest, after six months or more of complete disability from pain.

Spurs or calcified extrusions causing pressure on a nerve root probably occur more frequently than the medical profession has realized. Certain selected cases of intractable brachial neuritis will no doubt be more accurately diagnosed and operated upon in the future.

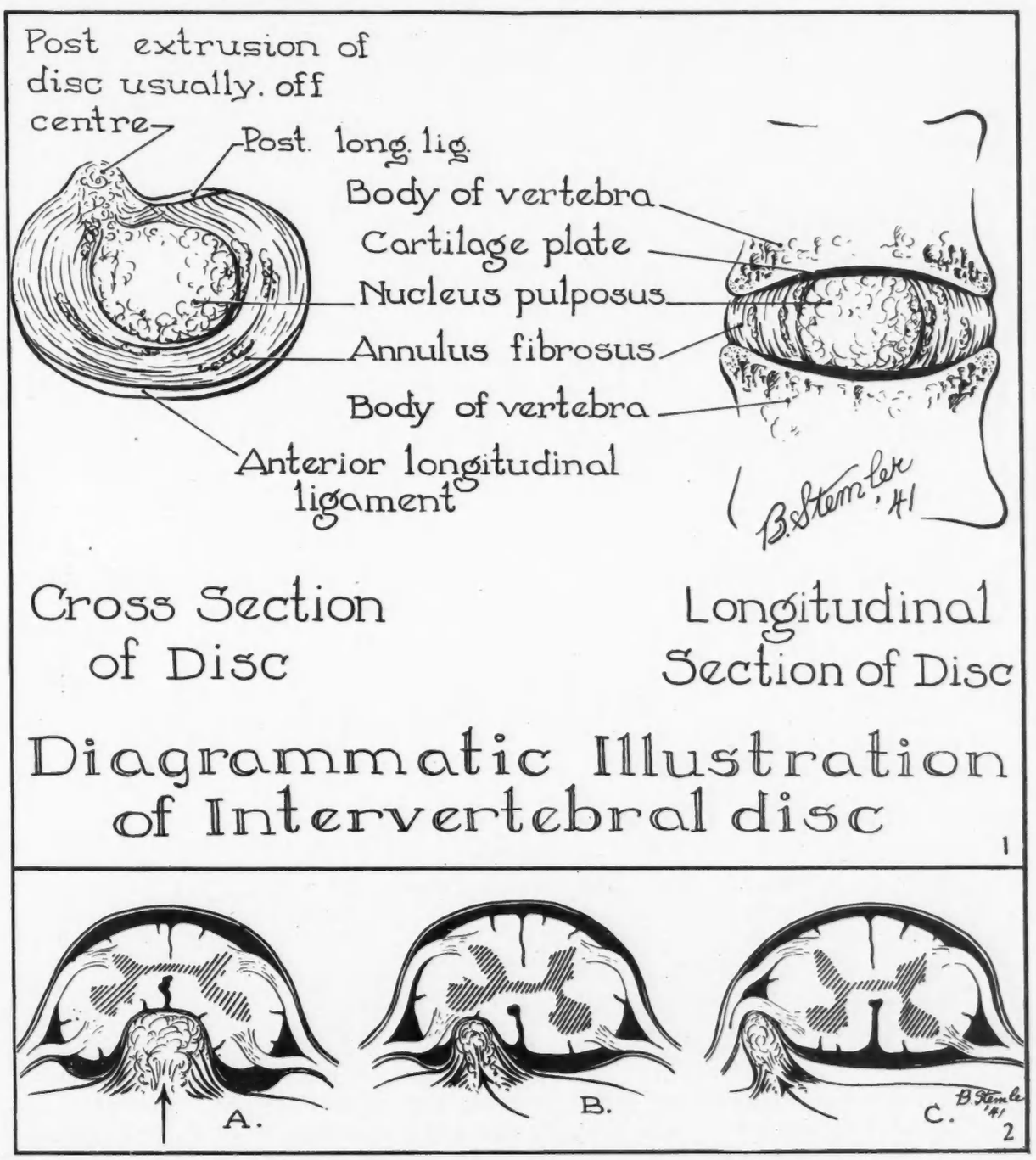


Fig. 2.—Variations in position of protusion of nucleus pulposus. (Modified from Stookey[3]).

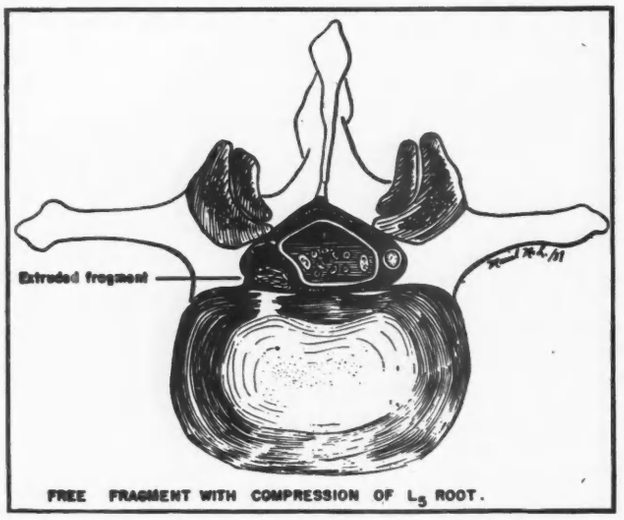


Fig. 3.—Free fragment with compression of L_5 root. (Published with the consent of Mixter).

THE LUMBAR SYNDROME

Symptomatically it is a syndrome of severe sciatica overshadowing any co-existent back pain. Most "sciaticas" are due to pressure on the first sacral or fifth lumbar nerve root from a bulging or extruded intervertebral disc (see Fig. 3). This has been shown to be true in the disabling or severe cases operated upon in this clinic as in other centres. It is reasonable to feel that milder cases are caused by the same lesion.

Any ideas or conclusions that we have concerning sciatica have developed during the past three and one-half years when our first case in a series of some ninety was operated upon. We became convinced that there was such a lesion as extrusion of a portion of a disc, and that this extrusion could squeeze a nerve root. Was this a common cause of sciatica? And if so what happened to these patients before we knew about this lesion? In a vague way we knew that patients with sciatica might have many attacks but they were not continuously disabled: we also knew that many patients go through one severe bout and then remain symptom-free indefinitely. The clinical course of a patient with a verified extruded disc consists of a series of attacks of low back pain, with or without sciatica, followed in time by disabling sciatica which dominates the picture. Between attacks there can be complete or nearly complete relief from pain. There is no reason to feel that the attacks of sciatica from which the patient recovered were caused by a different lesion to the one causing the attack at the time of operation. In other words spontaneous recovery is not a sound argument against the diagnosis of pressure from an extruded disc.

This intermittency of symptoms, a well established clinical fact, is not so easy to understand or explain. On the operating table we have seen lesions in which either the fifth lumbar or first sacral roots were humped back, stretched and squeezed by a portion of disc which could be lifted out as a detached or nearly detached piece. In a third of 50 such cases the patients had recovered from two or more attacks of severe sciatica comparable to the one at the time of operation. Why should the lesion produce a series of attacks? There are several explanations for this clinical fact: (*a*) The extruded disc material may lessen in size by retracing the pathway of escape from the main disc, or it may become sufficiently mobile to slip away from the nerve root, or œdema and swelling may subside. (*b*) The nerve root may accommodate itself to a fixed pressure by elongating, or by the subsidence of some traumatic œdema in the nerve root itself. A further extrusion could repeat the syndrome. (*c*) Prolonged pressure may bring about a physiological section of the nerve root, so that it no longer functions and there is no pain. It is not uncommon to see a cured sciatica as far as pain is concerned, but with a resultant weakness about the ankle, some numbness of the foot and a diminished or absent ankle jerk, signs due to permanent root damage.

I have gradually come to the conclusion that there is no real argument against the idea that practically all cases of sciatica are associated with pressure on the first sacral or fifth nerve roots. Occasionally this pressure may be due to adjacent disease involving the intra-dural or extra-dural spaces or the vertebræ themselves. The more common of these lesions in order of their frequency are tuberculosis, secondary carcinoma, carcinoma of the pelvis in its late stages, intra-dural tumours and primary tumours of the bone. These lesions will only explain a very small percentage, probably not more than 5 per cent of sciaticas.

The diagnosis of an extruded or bulging disc impinging on the fifth lumbar or first sacral root in a patient with sciatica is probably usually correct. In the small percentage of patients with a disability that justifies operation the lesion can practically always be clearly demonstrated. The diagnosis is presumed in the much

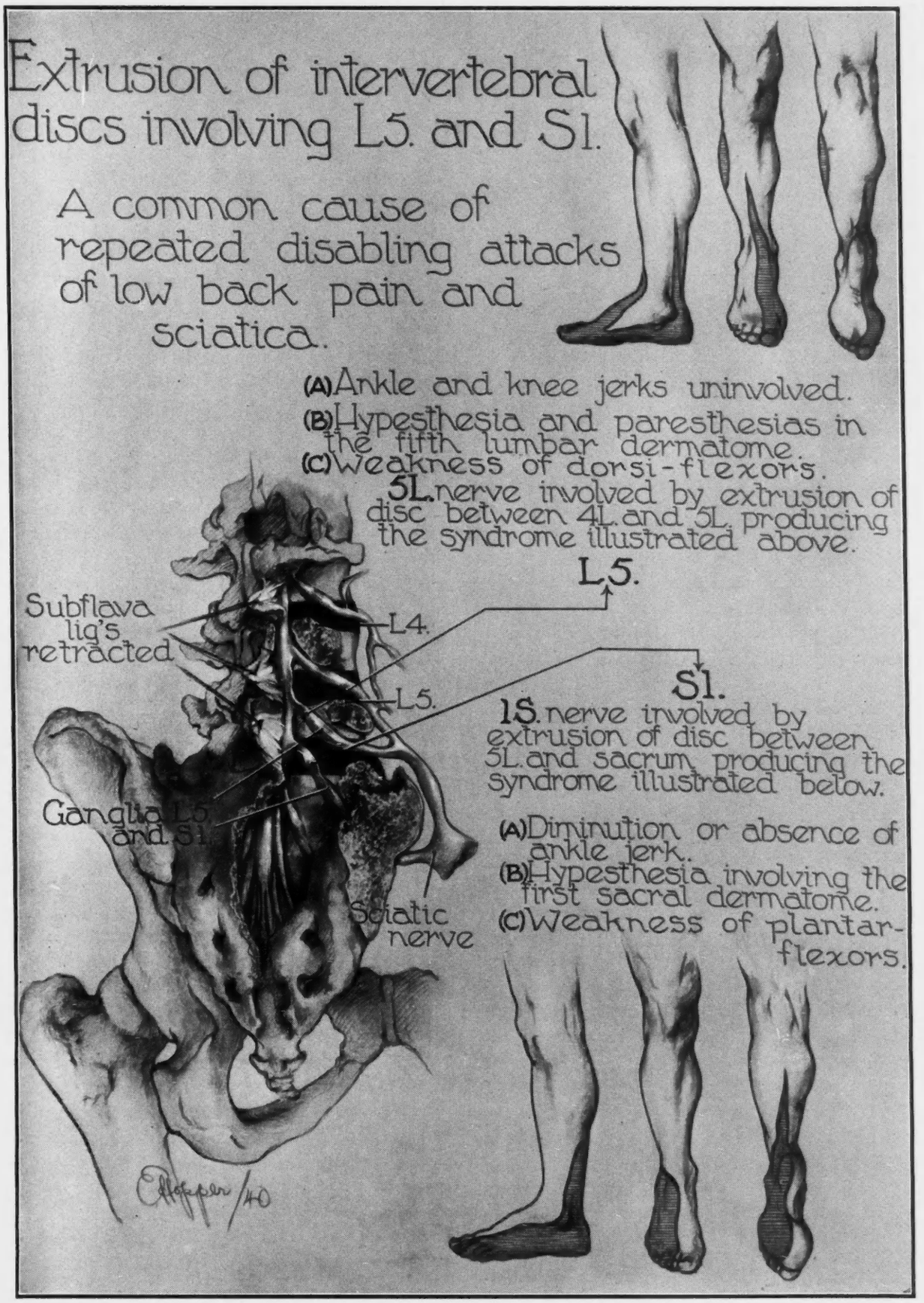


Fig. 4.—Drawing from an anatomical dissection of the lower lumbar and sacral spine. The characteristic neurological signs produced by compression of the 5th lumbar and 1st sacral roots are indicated at the right of the drawing.

larger group of patients cured by conservative means or who have recovered spontaneously.

ANATOMY AND PHYSIOLOGY

The sciatic nerve is formed from the fourth and fifth lumbar and the first, second and third sacral sensory and motor roots. The sensory roots have a wide deep distribution in the muscles and a more local skin distribution. For instance the inside of the foot and dorsal aspect of the great toe is predominantly supplied by the fifth lumbar root, whereas the first sacral distribution predominates over the dorsal aspect of the lateral toes and foot. Section of one of these roots does not cause complete loss of sensation and in some instances no demonstrable loss in these skin areas because of the overlap from other roots. Pressure on one of these nerve roots may produce burning or pins and needles sensation in their respective skin areas. The pain produced by pressure on either of these roots is widely distributed in the buttock, back of thigh, calf and lateral aspect of leg, heel and foot. This wide distribution of pain and deep tenderness from involvement of one of the roots of the sciatic nerve can be explained by the wide muscle sensory distribution of one root. The location of the pain varies in intensity and position in different patients with pressure on the same root. Thus the distribution of the pain does not aid in diagnosing the particular sciatic root involved. On the other hand skin paræsthesias, such as burning or pins and needles or numbness, are of great localizing value when they are present. These are signs and symptoms which are due to interference of function of a root or peripheral nerve. Motor weakness, atrophy and reflex changes when they occur, can be put in the same category.

Pressure on one nerve root may produce a stimulus which enters the cord and is referred along adjacent segmental roots. It can be argued that pain produced in a joint such as the lumbo-sacral or sacro-iliac may be referred out along the course of the sciatic roots, as reflex pain. Clinically, however, we have come to feel that when there is involvement of a joint the pain is predominantly in that area. In other words when sciatica dominates the picture one postulates pressure on a nerve root of the sciatic nerve. This is definitely true when loss of function of a nerve root can be demonstrated in the motor, sensory or reflex field. On the contrary when back pain and not sciatica predominates, one postulates some lesion of the back which does not cause pressure on one of the five roots of the sciatic nerve; ligament and joint strain would be the commonest of these lesions, although a disc which has lost its physiological function is frequently the underlying or basic cause.

THE TYPICAL CLINICAL SYNDROME OF A PATIENT WITH AN EXTRUDED DISC IN THE LUMBAR REGION

Usually a male between the ages of thirty and fifty. He has been laid off work because of pain in the buttock, back of thigh, behind the knee, in the calf, outer side of leg and heel. The pain varies in intensity in these situations in different individuals. In the acute stages the patient remains in bed. Movement, coughing and straining aggravate the tooth-achey, constant discomfort by superadded severe stabs of pain. The patient may have noticed some tingling, pins and needles sensation or numbness in the foot, and some weakness of the muscles about the ankle. There will usually be a history of previous attacks of stiff, painful back, often dating back to a back strain or injury. Now however, any back pain is overshadowed by the pain in the distribution of the sciatic nerve and it is for this that the patient seeks relief. In other words this is a patient with severe unilateral sciatica.

On examination with the patient stripped one notes: (1) A rigid lumbar spine, usually tilted away from the side of the sciatica. (2) A limp favouring the involved leg. (3) Tenderness over the sciatic nerve in the buttock, thigh and calf. (4) Straight leg raising, (sciatic nerve stretch) aggravates the pain. Deep abdominal pressure or prolonged jugular compression may reproduce this pain by raising the cerebrospinal fluid pressure. (5) Approximately one-half inch atrophy of the calf muscles on the involved side. (6) Careful sensory, motor and ankle reflex examination demonstrates a varying degree of loss of physiological function of the fifth lumbar or first sacral roots as follows.

THE LUMBAR NEUROLOGICAL SYNDROME IN PARTICLUAR

For all practical purposes extrusion of the disc in the lumbar region occurs between four and five lumbar and sacrum. Figs. 4 and 5

show the basic neurological syndromes which one keeps in mind.

There is a good deal of individual variation in these syndromes, accounted for no doubt by variations in the sensory and motor distribution of the same root and also by some variation in the relationship of the roots to the disc. Then again the size and exact location of the lesion varies, for instance a large lesion may involve the particular extra-dural root as it lies adjacent to the disc as well as one or more intra-dural roots.

The neurological findings in forty-seven frank cases have been analyzed. These cases were all verified by operation; the essential findings have been summarized as follows. Fourth disc (fifth lumbar root) 20 patients; 12 with diminished ankle jerk; 9 had adequate motor or sensory signs, 3 no help from motor or sensory signs; 8 with undisturbed ankle reflexes: 3 had adequate motor and sensory signs, 5 had negative neurological signs. Fifth disc (first sacral root) 27 patients; 19 with absent ankle jerk: 13 adequate neurological signs, 4 questionable neurological signs, 2 negative neurological signs; 7 with diminished ankle jerk: 6 had adequate neurological signs, 1 questionable neurological signs; 1 with normal ankle jerk, no neurological findings, a very definite large lesion.

SUMMARY AND CONCLUSIONS OF THIS NEUROLOGICAL ANALYSIS

1. In the complete absence of reflex, sensory and motor disturbance, the extrusion is from the fourth disc (one exception).

SUMMARY of FIFTH LUMBAR and FIRST SACRAL ROOT SYNDROMES

Fifth Lumbar Root (fourth disc)	First Sacral Root (fifth disc)
Numbness or Paraesthesia	
Inner side of foot	Outer side of foot
Ankle Jerk	
Normal or diminished	Absent
Muscle Weakness of Ankle	
Dorsi Flexors	Plantar Flexors

Fig. 5

2. When the ankle jerk is completely gone the extrusion is from the fifth disc (no exceptions).

3. When the ankle jerk is normal the lesion is from the fourth disc (one exception).

4. When the ankle jerk is diminished the lesions are about equally divided between fourth and fifth disc; careful motor and sensory examination will identify the correct disc in most cases.

We concluded after our study of these cases that operation could be undertaken without a myelogram. In about 15 per cent of such cases it would be necessary to explore both the fourth and fifth discs to uncover the lesion.

In support of this point of view we can state that during the past six months we have operated upon fifteen consecutive patients without a myelogram; in all patients a frank lesion was removed, but in two a mistake in localization

was made and in these it was necessary to explore both discs to discover the lesion. The two mistakes in localization were of no great consequence as additional exploration of a second disc adds only a few minutes to the operation and little if any structural weakening of the back.

CONSERVATIVE TREATMENT OF SCIATICA VERSUS OPERATIVE TREATMENT

As indicated in this paper we have come to the conclusion that unilateral sciatica is almost always due to pressure on the sciatic nerve roots at the fourth or fifth disc. X-ray examination rules out other known causes of pressure, such as secondary carcinoma, primary new growths involving bone, tuberculous spondylolisthesis, etc. The occasional intra-dural tumour usually will produce widespread neurological signs. The late stages of secondary carcinoma in the pelvis may cause pressure on the lumbo-sacral trunk. The disease will have been suspected and diagnosed long before sciatica develops. In actual practice one is faced in 95 per cent of patients with the problem of what in the past was known as idiopathic sciatica. Today careful neurological examination discloses interference in the function of a nerve root in the majority of the severe cases. An extruded disc can be disclosed in the majority of these cases. It is reasonable then to conclude that the milder cases have the same underlying pathology. It has been clearly demonstrated that the sciatica caused by an extruded disc may subside. This is compatible with the well known clinical fact that in most cases of sciatica the pain does subside. Hence the rationale of conservative treatment by adequate rest.

Adequate rest varies from some lessening of activity to a period of weeks in bed. In the more severe cases sedatives and continuous rest on a firm mattress are indicated until a moderate degree of comfort is obtained. A plaster jacket will then be tolerated along with a further period of absolute bed rest. This may be followed by a period of ambulatory activity in the cast or with a spinal brace to limit movement of the lumbar spine. A recurrence following such conservative treatment justifies consideration of surgical intervention. Surgical intervention may also be considered wise if the attack does not show definite subsidence after a period of weeks. The economic status, and interference with livelihood must be considered. Taking everything into consideration only a small percentage of patients with sciatica require operation and removal of the extruded disc.

MYELOGRAMS

In our early cases myelograms with air, lipiodol or thorotrast were done on all patients. Positive findings led to operation on many patients in whom the clinical picture would not justify operative interference in the light of experience today. On the other hand operation was not undertaken in a few patients because the myelogram was negative, the lesion being too far lateral to produce a filling defect in the dural canal. Today in these patients operation would be undertaken on clinical grounds, even with a negative myelogram.

Air proved unsatisfactory in our hands. Both thorotrast and lipiodol produce a varying degree of reaction and in some patients persistent low sacral and back pain. The psychological effect of lipiodol scattered up and down the spinal canal was bad in certain patients. Much could be made of this in the medico-legal case.

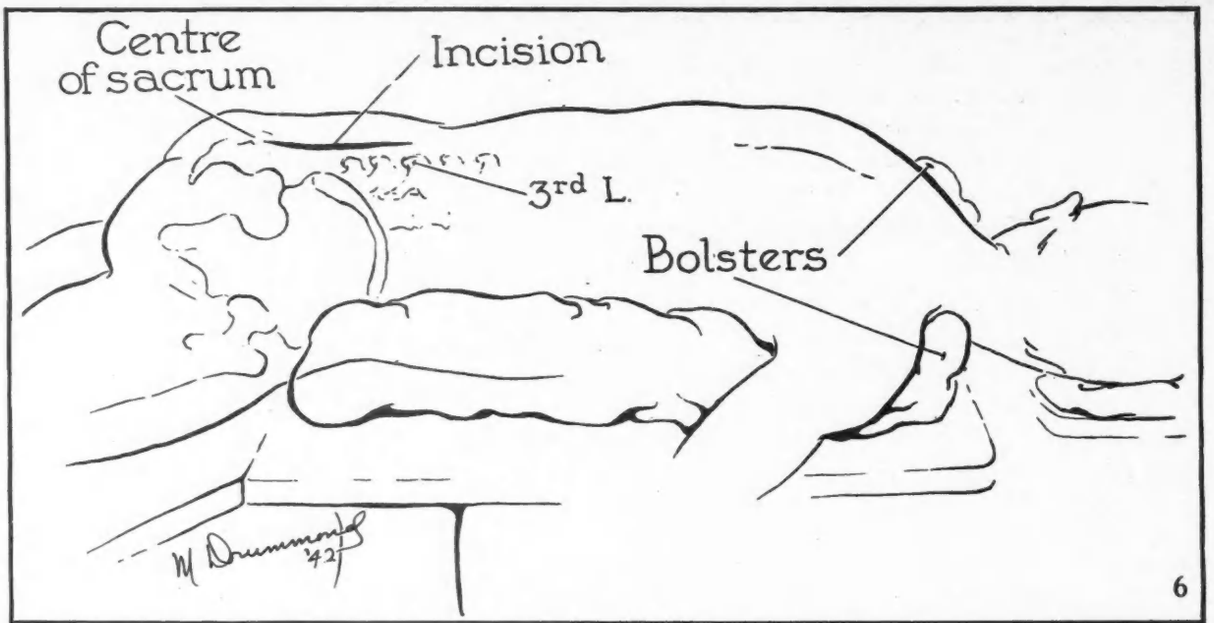
In general it seems best to avoid introducing a foreign substance into the cerebrospinal fluid unless absolutely necessary. It is fair to state that today many neurological surgeons prefer to run the slight risk of a negative exploration in carefully selected clinical patients rather than introduce a foreign substance into the cerebrospinal fluid.

In the occasional problem case where a myelogram is considered to be essential the technique recently introduced by Mixter* is valuable.

OPERATIVE TECHNIQUE

It must be emphasized that the operation for removal of an extruded disc is only applicable to the patient in whom sciatica and not back pain constitutes the disability. Where back pain constitutes the disability the underlying lesion may be and probably frequently is, a disc which has lost its physiological function; quite possibly a loose piece of disc has not yet extruded and impinged on a nerve root to produce sciatica. In these patients operation may be indicated after conservative treatment has failed. The operation however, should be a

* Under the screen, with the patient prone, the lipiodol is floated opposite the needle introduced between three and four lumbar; with the needle point close to the anterior wall of the canal, most of the lipiodol can be slowly aspirated.



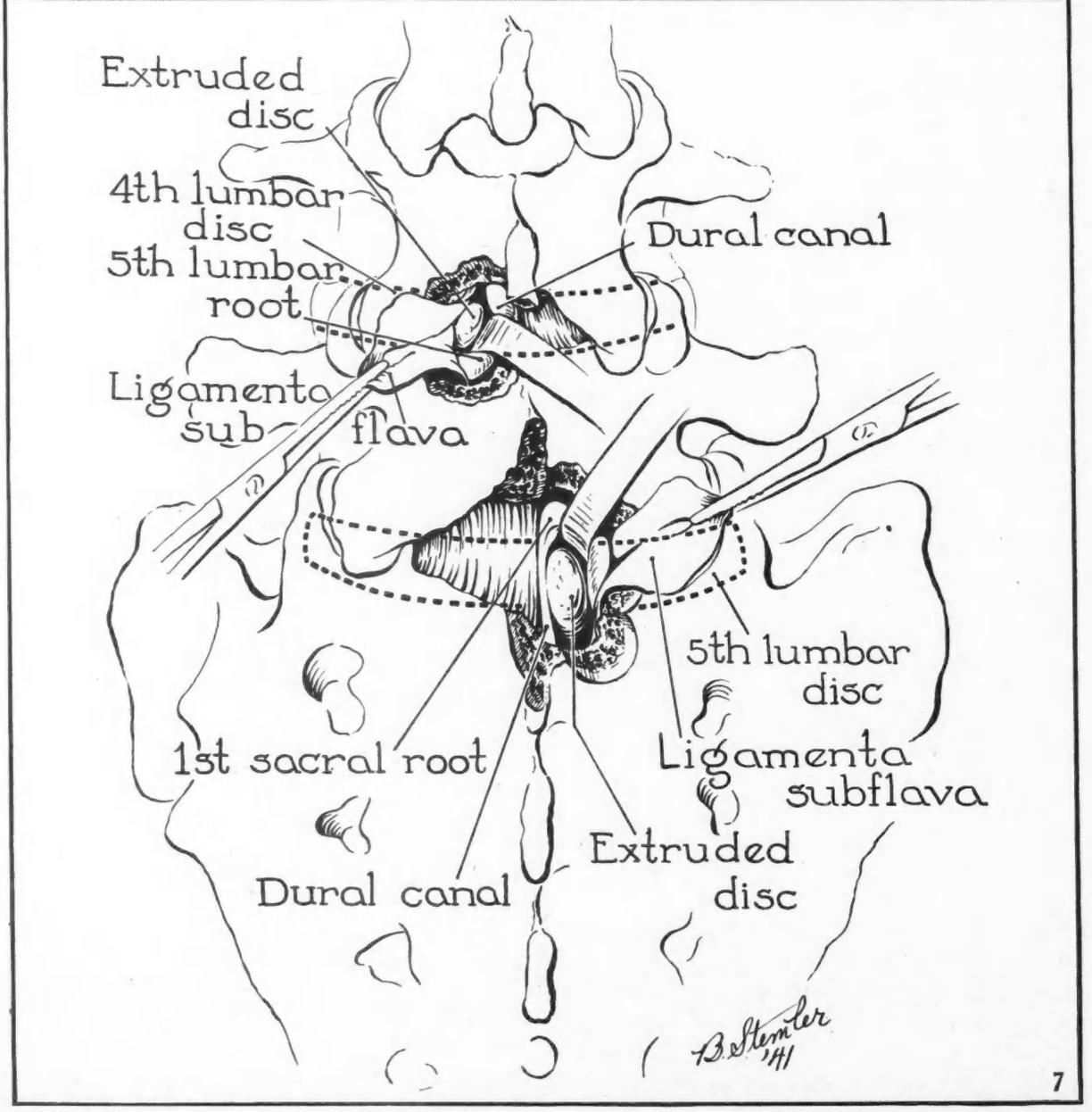


Fig. 6.—Approach in case of extruded disc. **Fig. 7.**—Exposure of 1st sacral and 5th lumbar nerve in case of extruded disc.

bone graft fixation of the lumbar spine and not exploration for an extruded disc.

The following points are of importance: Fig. 6 shows the incision and position of the patient, long tightly rolled bolsters are placed from shoulder to pelvis so that pressure is removed from the abdomen, thus preventing congestion of the extra-dural veins; flexion of the patient at the pelvis widens the inter-laminar spaces. We prefer a moderately long incision so that the muscles are not unduly traumatized with self-retaining retractors. The incision should give adequate exposure of the sacrum so orientation can be certain by accurate identification of the fifth lumbar and upper part of the sacrum, this incision will centre just about opposite the fifth lumbar.

Fig. 7 illustrates the amount of bone which is usually removed. Frequently one of the spines is bitten into on either side and bent laterally to give more adequate exposure of the involved space, after removal of the bone the ligamentum sub-flavum is dissected out. We prefer to retract the ligament laterally leaving its attachment to the deep surface of the articular facets. After removal of the extruded disc and a thorough drying up of the field by coagulating any bleeding extra-dural veins, the ligament is allowed to fall back into place, otherwise the nerve becomes embedded in organized scar tissue.

RESULTS FOLLOWING REMOVAL OF THE EXTRUDED DISC IN PATIENTS WITH SCIATICA

Fifty-seven patients have been carefully followed. The post-operative period varies from three and one-half years to four months.

Number	*Result percentage*	
26	100	No complaints of any sort.
22	90	Some slight complaint, such as stiffness of back, mild occasional radiating pain, etc.
4	75	
5	50	

Quite a number of these patients are at hard work, such as farming, truck driving, mucking in a mine, etc., and consider themselves perfectly well.

Two patients in a series of eighty have had a recurrence, one of these has been verified at operation.

As greater experience is gained in the proper selection of patients for operation, the results improve. This is especially true if one operates only on the patients in whom sciatica constitutes the disability. Also, as in trigeminal neuralgia one should operate at a time when the patient is having severe pain and is anxious to obtain relief. Compensation cases constitute a separate problem and require careful selection, especially in times when work is difficult to obtain.

After operation patients are in bed for ten days or two weeks, and return to their occupations in from one to two months. There have been no post-operative deaths in this series of ninety-four patients (January 26, 1942).

SUMMARY

1. Pressure on one of the roots of the sciatic nerve at the level of the fourth or fifth disc adequately explains the pain of any attack of sciatica in most patients (possibly 90 per cent).

2. The majority of these patients recover spontaneously or with adequate conservative treatment.

3. Certain patients require removal of the extruded portion of the disc by operation. So far, in properly selected cases the results are usually highly satisfactory. Further experience may indicate that removal of the extrusion should be combined with fusion in certain of the younger patients.

4. The selection of patients for operation should be based on the clinical picture of severe, disabling sciatica, present at the time of operation.

5. With proper clinical selection, a myelogram is seldom necessary either for diagnosis or localization of the lesion. The indiscriminate use of lipiodol or thorotrast should be discouraged.

6. Occasionally an extruded disc at high levels is the cause of severe, brachial neuritis, or signs indicating pressure on the spinal cord.

I wish to acknowledge the helpful information obtained from numerous discussions with Spurling, Semmes and Mixter. Bradford and Spurling's monograph[2] will be of great interest to those desiring further information on the subject.

The drawings were made under the supervision of Miss Wishart, Medical Art Service of the University of Toronto.

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COARCTATION OF THE AORTA

BY A. D. IRVINE

Edmonton

A BRIEF review of the development of the vascular system as outlined in any standard textbook of anatomy or embryology is an excellent approach to the subject of coarctation of the aorta.

The first stage in the development of the heart and great vessels is the appearance of two tubular spaces, one on each side of the midline in the pericardial area of the embryo. These run back as separate vessels but later fuse to form the thoracic and abdominal aortæ.

As the embryo increases in size there is flexion and anterior growth of the vascular tubes so that the pericardial area and these vessels become folded under the head, and end by lying on the ventral aspect of the fore-gut. As a result each of these vessels now consists of a dorsal and a ventral portion, the two joined anteriorly by an arch. At this stage they are called primitive aortæ and the anterior connecting portions are designated the first aortic arches. Five additional arches very soon develop on each side behind the first ones, so that at one stage six pairs of aortic arches are present. These aortic arches in the fish pass through the gills where the blood is aerated. In the human only a few of the arches persist, forming the major vessels as shown in Fig. 1.

In the pericardial area the two ventral primitive aortæ fuse to form a fish-like two-chambered heart. By a succession of rotations and flexions the adult heart develops from this primitive beginning.

During intrauterine life the lungs of the fetus are not functioning and only a very small part of the blood in the pulmonary artery goes to them. Most of it is shunted through the ductus arteriosus to the upper part of the descending aorta to be carried to the trunk, lower extremities, and placenta. The blood pumped by the left heart supplies chiefly the head and arms. Thus there is no great blood flow through that part of the descending arch between the origin of the left subclavian artery and the opening of the ductus arteriosus. Therefore this part is narrowed and is known as the fetal isthmus.

Very soon after birth when the lungs are functioning the ductus no longer is of use and degenerates to a fibrous band, the ligamentum arteriosum.

DEFINITION AND CLASSIFICATION

Coarctation of the aorta is defined as a partial or complete stenosis of the aorta at, or close to, the level of insertion of the ductus arteriosus.

The condition is further differentiated into the so-called infantile and adult types. The infantile type is characterized by a varying degree of narrowing of the vessel lumen between the origin of the left subclavian artery and the site of insertion of the ligamentum arteriosum, that is, in the region of the fetal isthmus. This form of coarctation seems to be a persistence or exaggeration of the condition obtaining during intrauterine life when the pulmonary artery carried the blood for the lower trunk and legs to the descending aorta through the ductus. This type of coarctation is described only to complete the discussion and will not be mentioned further.

In the adult type of coarctation there is a partial or complete obliteration of the aortic arch adjacent to the opening of the ductus arteriosus (Fig. 2).

INCIDENCE

Morgagni is said by Evans[3] to have first recognized the condition in a dissected cadaver in 1760. It is admittedly rare, and, judging by the reported cases, seldom diagnosed during life. In 1928 Abbott's classical article on the subject appeared[1] in which she collected all the reported cases up to that time. These, together with her own, numbered only 200. In addition she mentions 5 others known to her which came to autopsy but had not been reported. Of the 200 cases only 28 were diagnosed ante mortem.

Benkwitz and Hunter[2] summarized 75 cases that were reported between 1928 and 1935. Apparently as the condition became better known, largely because of Abbott's comprehensive paper, it was recognized more frequently.

The rarity of the condition is emphasized by the following table compiled by Goodson.[5]

Series	*Number of autopsies*	*Cases of coarctation*
Hartford Hospital	1,693	1
Guy's Hospital	22,316	18
Meixner	21,481	16
Ophüls	3,000	1
Jaffe and Sternberg	4,500	1
London Hospital	19,217	16
Massachusetts General Hospital	5,000	2
Totals	77,207	55

Probable incidence per 100,000 autopsies 77.

This would make a probable 77 cases per 100,000 autopsies.

ETIOLOGY

The cause of this anomaly is not known. Earlier writers for the most part accepted the Skodaic theory, which was first offered by Craigie in 1841, and later popularized by Skoda. This hypothesis assumes that in these cases there is an extension into the adjacent wall of the aorta of the type of tissue making up the walls of the ductus arteriosus. Then when obliteration of the ductus occurs the same fibrosis and contraction takes place in the tissue in the aortic wall, causing a constriction. But such an extension of "peculiar tissue" has never been demonstrated microscopically. A more likely cause is the mechanical drag of the ligamentum arteriosum, producing a kinking at this level. This traction in some cases is strong enough to produce a tent-shaped traction aneurysm at the point of attachment.

More recent writers believe that the condition is usually an anomaly of development involving the left ventral aorta and fourth, fifth and sixth aortic arches on this side. In support of this they cite the anomalous vessels frequently reported in this region. These appear to be due to aortic arches which have persisted instead of disappearing in the usual manner. The presence of valves or folds, lined with normal intima, producing stenosis also is regarded as evidence of unusual development of the embryonic arterial wall. Frequent associated anomalies of the heart and aortic valves further support this theory.

CHANGES IN THE CIRCULATORY SYSTEM RESULTING FROM COARCTATION

The congenital anomalies of heart and great vessels frequently associated with coarctation will not be considered. They are concomitants rather than secondary results.

The most striking change is the development of a collateral circulation to link the proximal aortic segment with the trunk and lower extremities (Fig. 3).[4] The extent of this collateral system is governed by the degree of stenosis present in the aorta. In approximately a quarter of the reported cases complete atresia was present. In these a high degree of efficiency must be present in the collateral compensatory system if life is to be sustained.

The connecting vessels are most prominent in the upper thoracic area as a rule. Usually the superior intercostal arteries, arising from the subclavians, develop powerful anastomoses with the first intercostals which arise from the aorta just below the level of constriction. Then, too, the posterior scapular, interscapular, and subscapular arteries run through from behind to pierce the intercostal muscles and their usually insignificant connections open up to form large vessels communicating with the second to about the fourth intercostal arteries. The intercostal arteries also communicate anteriorly with the internal mammary arteries which are receiving blood from the proximal aortic segment by way of the subclavians. As a result of the large volume of blood carried under high pressure the collateral arteries dilate and become large, turgid, tortuous vessels rather than the small, insignificant ones seen in the normal individual (Fig. 4). The mass of dilated, engorged arteries in the supraclavicular, scapular, and intercostal areas are of the greatest importance in ante mortem diagnosis as will be seen later.

A less frequent compensating mechanism is between the internal mammary vessels and the epigastric branches of the external iliacs over the abdominal wall.

Cardiac enlargement is another change frequently, but not always, found in the circulatory system. The work of the heart is very much increased by the necessity of forcing the blood through a collateral system instead of through a normal patent aorta. In order to ensure an adequate flow of blood to the trunk and lower limbs a marked increase in blood pressure in the proximal aorta and upper extremity is necessary.

If the heart has no congenital lesion and the heart muscle is normal no hypertrophy may be apparent for years. But as time goes on the cardiac reserve is likely to lessen, due to intercurrent infection or continued excessive muscular activity. In about three quarters of the

reported cases the heart had suffered from the abnormally high demands imposed on it and indicated this by hypertrophy.

Dilatation of the aorta proximal to the atresia is a very frequent finding in coarctation. This is secondary to the hypertension present in the aortic lumen. The dilatation may be so great as to form a large saccular aneurysm. Some writers have pointed out that in many cases of coarctation there is a congenital weakness of the middle coat of the aortic wall. This allows the intravascular pressure to produce a more marked dilatation than if the media were of normal thickness and quality. This congenital weakness is given as a probable contributory cause for the frequent rupture of the aorta in this region and the large number of dissecting aneurysms reported associated with coarctation.

CLINICAL CONSIDERATIONS

The condition, although present through infancy and childhood, usually does not become apparent till adolescence or early adult life. A chart showing the average age at death in Abbott's cases throws into clear relief the high mortality in the second, third, and fourth decades.

Excessive activity or an infection by its toxic effect on the myocardium, may lessen the cardiac reserve and make manifest for the first time the symptoms of dyspnœa and palpitation on exertion. In these cases cardiac failure develops progressively, and brings about the patient's death. In other cases, rupture of the proximal aorta or a dissecting aneurysm may be the dramatic cause of death without premonitory symptoms.

Approximately three times as many males as females are reported with coarctation. One hundred and forty-seven were males and 48 were females in the 195 cases in Abbott's series in which the sex was known. In Benkwitz and Hunter's review 55 were males, 16 were females, and in two the sex was not given. No one has offered a satisfactory explanation for the predilection for males shown by this congenital anomaly. Evans[3] states that there is no such difference of sex incidence but he has little support in the literature.

The clinical findings in coarctation of the aorta are vascular rather than cardiac. Due to the obstruction to free flow of blood to the trunks and lower limbs there is an abundant supply to the upper part of the body and head. This may be indicated by visible pulsations in the suprasternal notch, in the supraclavicular fossæ, the scapular areas or even in the intercostal spaces. Palpation in these areas may disclose pulsating tortuous vessels even if they are not visible. Auscultation also may demonstrate a loud bruit above the sternum, in the root of the neck, about the scapulæ, or even over the greater part of the posterior thorax. It will be remembered that these are the areas in which most of the large anastomosing arteries forming the collateral circulation have developed.

Some writers have described their patients as being muscular and well developed in the upper trunk and arms and of unusually high intelligence due to the hyperæmia of these parts and the brain. The lower trunk and legs on the other hand were underdeveloped. Cases with such marked differences between upper and lower development are probably rare, or many more patients would have been diagnosed ante mortem.

The difference in blood supply between the upper and lower extremities gives one a clinical finding which is diagnostic, namely, a marked difference between the blood pressures taken in the arm and in the leg. The usual difference between the brachial and popliteal pressures with the patient recumbent is said to be 20 to 40 mm. Hg. A greater variation than this is evidence of obstruction to the free flow of the blood through the aorta. An absent, diminished, or retarded pulse in the lower extremities with an increased palpable pulse in the upper is merely another manifestation of the difference in tension and is also diagnostic. There also may be a great difference in the quality of the pulse and blood pressure in the two arms. This is to be expected if there is an aneurysm or dilatation of the proximal segment of the aorta or the bases of the great vessels.

X-RAY DIAGNOSIS

The pathognomonic radiological sign of coarctation of the aorta is a notching or scalloping of the inferior surfaces of some of the ribs. The presence of these is known as Rösler's sign, after the writer who first recognized them and reported the finding in 1928. They are bilateral and have smooth well-defined edges. They are pressure defects caused by the dilated, tortuous, intercostal arteries which form part of the collateral circulation connecting the proximal and distal portions of the

aorta. These defects are more numerous in the upper ribs due to the greater part of the collateral circulation being effected by the upper intercostal arteries. These markings are not present in all cases of coarctation, but when present are regarded as diagnostic.

Another common x-ray finding is cardiac enlargement, for, as noted above, most cases eventually develop hypertrophy of at least the left ventricle. This finding is not diagnostic, but merely supporting evidence. It is said that the actual constriction in the aorta may be visualized fluoroscopically or radiographically in certain cases when the patient is placed in the left oblique position. There can also be seen the dilatation of the ascending aorta and arch if such be present. Absence of the aortic knob would be expected in a typical case of coarctation, but many cases show a prominent bulb, due presumably to dilatation of the aorta just proximal to the constriction.

Direct visualization of the site of stenosis and the anastomosing collaterals have been reported by the use of arteriography. This cannot be regarded as beyond the experimental stage and is not a practical procedure for many radiologists.

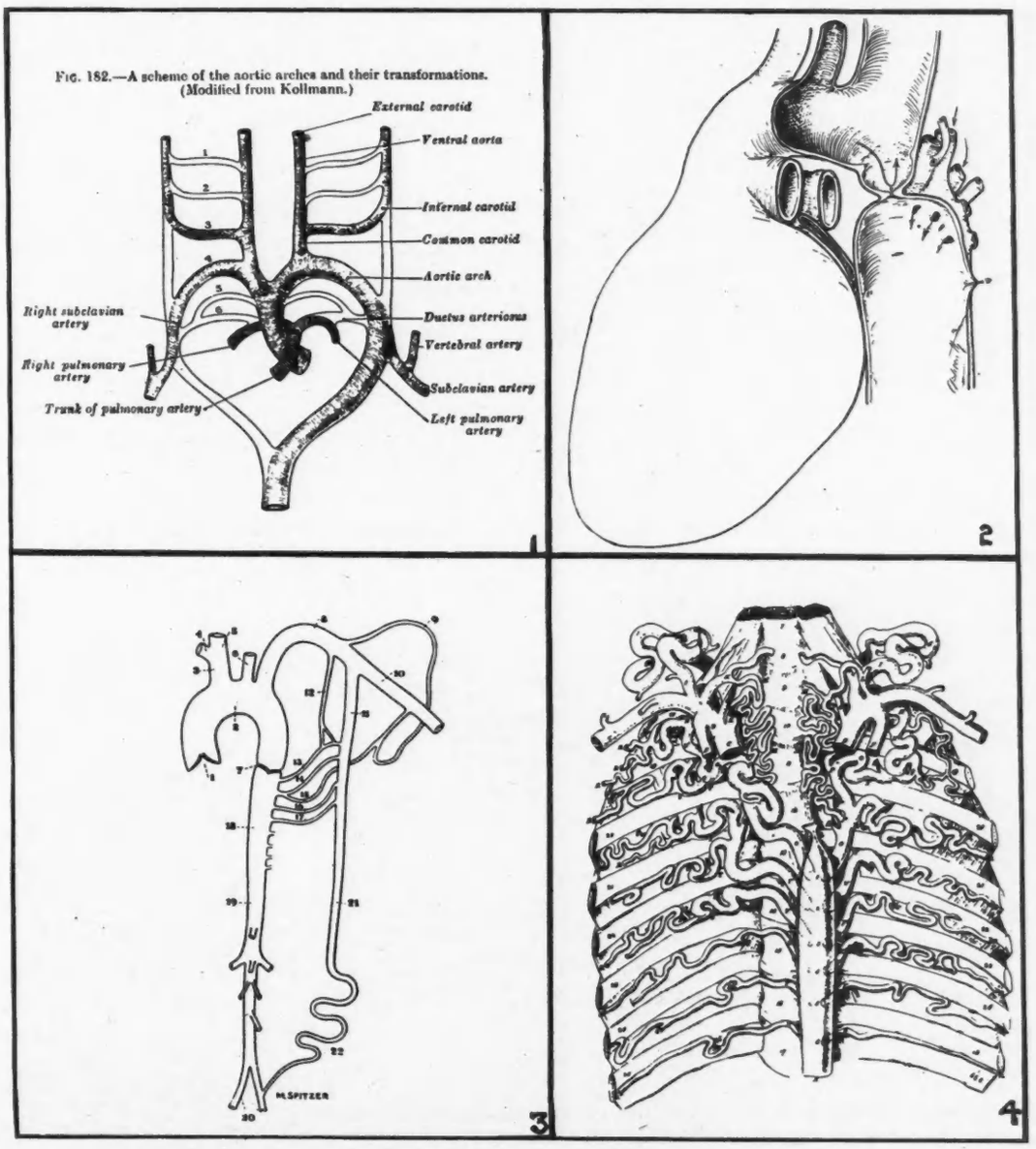

Fig. 1.—Scheme of the aortic arches and their transformations. (Gray's anatomy). **Fig. 2.**—Drawing to show a case of coarctation of the aorta with almost complete atresia of adult type and infantile constriction immediately above. (Benkwitz and Hunter). **Fig. 3.**—Diagram to illustrate paths of collateral blood flow in coarctation. (Gitlow and Sommer). **Fig. 4.**—Drawing to show the marked arterial collateral anastomoses and the extreme size and tortuosity of the intercostal arteries. (Meckel's case from Abbott).

REPORT OF CASES

Within one year I have had the good fortune to see two patients with this condition. In addition to these my confrère, Dr. P. H. Malcolmson, has kindly lent me the data on a case diagnosed by him during the same period.

CASE 1

W.L., age 32 years, a white male of English descent, who was a foreman at a meat packing plant. He was admitted to the Edmonton General Hospital on March 7, 1940, by Dr. F. A. Keillor because of cough and dyspnœa for ten days with blood-streaked sputum. The functional inquiry elicited a history of severe pain in his chest four weeks before admission while lifting. This seemed to shoot from the centre of his back towards the front. There was also an indefinite history of other pains in the chest some time prior to admission. These were regarded as being due to strained dorsal muscles. The patient had always been a hard worker and had taken part in strenuous athletics. There had been no dyspnœa till onset of present illness. The routine examination of the chest by a house surgeon disclosed râles over most of the chest and the vessels of the neck seemed to pulsate in an exaggerated manner. An x-ray examination of the chest was requested and the report reads in part (Figs. 5 and 6): "The left portion of the cardiac shadow is somewhat prominent. Numerous ribs show well-defined defects in relation to their inferior borders. These defects are supposed to be pathognomonic of coarctation of the aorta. In the right lung some increase in density is present in the perihilar and infrahilar areas. This presents the appearance of a right-sided central pneumonia."

The progress notes indicate that following x-ray report a further examination of the chest disclosed a souffle in the supraclavicular fossæ on both sides and a systolic murmur at the base transmitted to the axilla and left side of the chest. The pressure is recorded as 165/110 but was taken only in the arm.

This patient made an uneventful recovery from his pneumonia and was discharged in 23 days with no symptoms. Dr. Keillor was kind enough to send the patient to my office for a recheck film. This showed the same rib defects and satisfactory resolution of the bronchopneumonia previously present.

Comment.—This appears to be a case of coarctation detected during routine x-ray chest examination, the diagnosis being made on the pathognomonic finding of pressure defects in the inferior surfaces of some of the ribs. The symptoms that brought him under medical attention were due to a bronchopneumonia and when this resolved he had no other complaints. The history of pain in his chest some weeks before admission may or may not have been related to the coarctation. If so, pain had disappeared before he was admitted and was not present at a time when his cardiac reserve should have suffered from toxæmia and anoxæmic secondary to the bronchopneumonia.

The hypertension in the upper extremity, the exaggerated pulsations in the neck vessels, the souffle noted over the collateral arteries and the left-sided cardiac hypertrophy are all further supporting evidence of coarctation.

CASE 2

H.H., a white male army recruit, age 36, from rural Alberta had a chest film taken on February 8, 1941, as a routine part of his medical examination before enlistment (Figs. 7 and 8).

The transverse diameter of the heart was 15.0 cm. as compared with a transverse diameter of the chest of 29.8 cm. The x-ray report read: "The lungs are clear. Many of the ribs show areas of pressure erosion on their inferior aspects. Radiologically this is characteristic of the findings seen in coarctation of the aorta, the pressure defects being due to enlargement of the intercostal

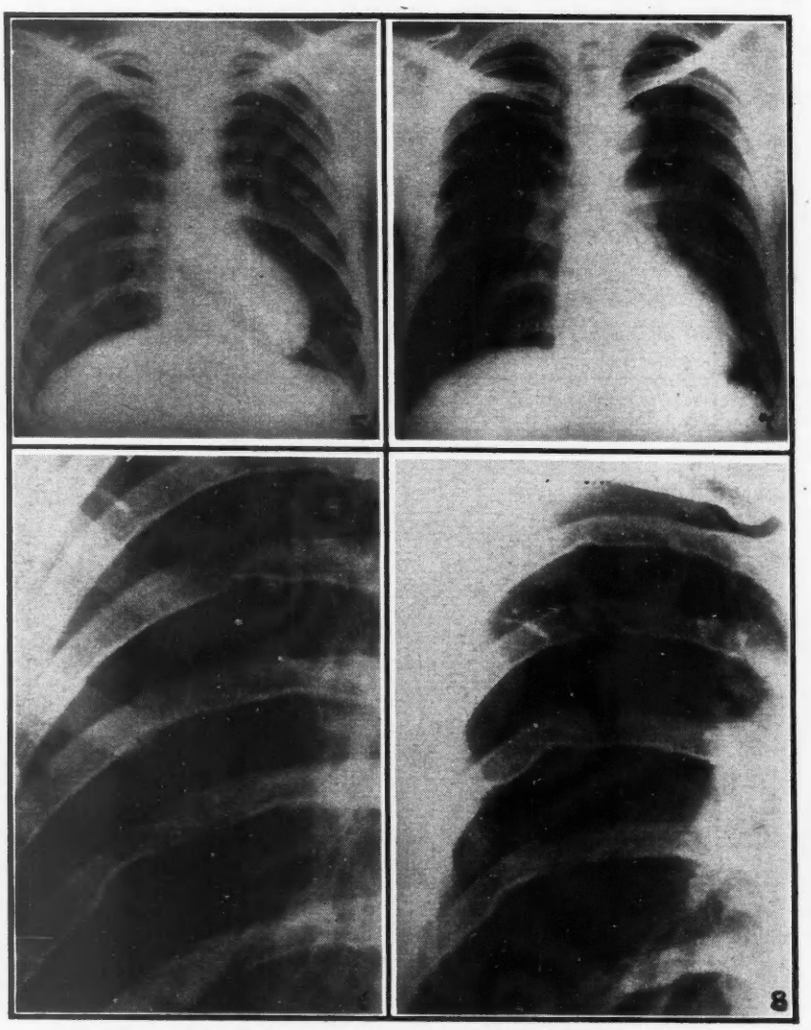

Fig. 5.—Radiograph of the chest, Case 1. Note rib notchings. **Fig. 6.**—More detailed view of Fig. 5 to show rib defects. **Fig. 7.**—Radiograph of the chest, Case 2. Rosler's sign also can be seen in ribs. **Fig. 8.**—More detailed view of Fig. 7 to show rib defects.

arteries. The cardiac enlargement is presumably secondary to the hypertension present in this condition."

The prospective recruit was examined by Lt.-Col. Walter H. Scott, the medical consultant for the Edmonton district, and I am indebted to him for the following copy of his notes: "No history of illness. Has done hard work all his life making ties. Examination shows forcible pulsations visible and palpable in neck and arms. Whole neck pulsates. Cardiac enlargement. Systolic murmur at all valves but faint at apex, tricuspid and aorta, and long and louder at pulmonic cartilage. Blood pressure: left arm 185/100; left leg 120/100; right arm 200/120; right leg 115/100. Systolic murmur well heard at apices of both lungs posteriorly. Summary. Coarctation of the aorta. Unfit."

Comment.—Case 2 is almost a repetition of Case 1. The condition was accidentally found during an x-ray examination of the chest done with no thought of coarctation being present. The diagnosis was based in Rösler's sign of erosion of the ribs. A clinical examination done later confirmed the x-ray diagnosis by discovering visible and palpable pulsations due to the dilated collateral anastomosis, hypertension in the upper extremity and disparity between the blood pressures of the brachial and femoral arteries.

The roentgenogram of this case shows a prominent bulb.

The case report supplied by Dr. Malcolmson was also of a recruit. He showed the pathognomonic rib defects in the roentgenogram and had secondary cardiac enlargement. Physical examination discovered marked hypertension in both arms with a much lower tension in the femoral arteries. Bruit was easily detected over the anastomosing branches in the scapular and upper thoracic areas.

This case is almost a duplicate of Case 2 above. The condition had been overlooked in the first routine medical examination upon application.

SUMMARY

1. Coarctation of the aorta is one of the more rare anomalies of the cardiovascular system. Although present during infancy and childhood it usually does not become manifest till adolescence or early adult life.

2. The most important change occurring in the vascular system is the development of a collateral circulation between the proximal and distal aortic segments. This is chiefly by the scapular, mammary and intercostal arteries.

3. Clinically, the condition is diagnosed by the hypertension in the upper portions of the body contrasted with hypotension in the lower, coupled with evidence of dilated collateral arteries.

4. Radiologically, the findings of smooth notching in the inferior surfaces of the ribs is pathognomonic. This so-called Rösler's sign is not present in all cases. It is due to the dilated tortuous intercostal arteries which take part in the collateral circulation.

5. Three cases of coarctation of the aorta discovered accidentally and confirmed by subsequent clinical examination are reported.

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HYPERTHYROIDISM TREATED BY ŒSTROGENS

BY WILFRED E. SHUTE, B.A., M.D., *Guelph, Ont.*, AND
EVAN V. SHUTE, B.A., M.B., F.R.C.S.(C), *London, Ont.*

IN 1933 Benazzi[1] found that an œstrogen administered to young rats induced an inactive phase in their thyroids. He pointed out that several Italian physicians had treated Grave's disease successfully, even before that time, by the use of œstrogens. Karp and Kostkiewicz[2] found colloid degeneration of the thyroid gland in rabbits similarly treated. Heyl, de Jongh and Kooy[3] observed decreased thyroid activity in the human subject after injections of an œstrogen and ascribed this effect to a decreased secretion of the thyreotropic hormone from the anterior pituitary. This explanation has been confirmed since by other workers. From all the foregoing it appeared to one of us (E.V.S.) that there might be some justification for a trial of œstrogenic therapy in the preoperative management of a patient preparing for her third operation for exophthalmic goitre.

CASE 1

Mrs. J.J., aged 25 years, was first seen in the Endocrine Clinic at Victoria Hospital on September 19, 1936. She had had a bilateral ligation of the thyroid vessels in August, 1930. The operative wound became infected and drained for months. After preparation with Lugol's iodine for two weeks, she had had the right lobe removed at a second operation in October, 1932. In March, 1936, her hyperthyroid

symptoms recurred one month after her second stillbirth (this one was ascribed to placenta prævia). She was put on Lugol's iodine on May 4th, and this was continued until her third operation on December 2, 1936. When seen by us in September she exhibited marked exophthalmos, restlessness, tremor, hyperactive reflexes, undue perspiration and she had lost a good deal of weight in the preceding months. She tired readily, but there was no undue cold tolerance.

An electrocardiogram in May had shown a normal sinus rhythm and a sinus tachycardia of 125. This pulse rate had not decreased in the interval — when we saw her it was 152. Her weight was 132. On October 1st her basal metabolic rate was plus 20. On October 6th her blood œstrogen was negative,[4] and accordingly she was given 10,000 international units of progynon B hypodermically each week. On October 20th, her weight was 134, pulse 136, and she "felt 100 per cent better". The progynon B was given twice as often thereafter. On November 2nd, her basal rate was still plus 25, but her pulse rate was only 92 and her weight was still 134 pounds. On November 5th an iodine tolerance test showed a lower curve than normal. For example, in 30 minutes there was 65 per cent of iodine in the blood, in two hours only 1 per cent, and in four hours none remained. On November 27th she was admitted to hospital. On the 29th her non-protein nitrogen was 31, her blood sugar 88, her blood count was normal, her blood pressure was 135/78, basal rate plus 24, and weight 133½ pounds. The thyroidectomy was performed on December 2nd. Her convalescence was uneventful. On December 29th her basal rate was plus 11 and on January 8, 1937, it was minus 6. By that time she had developed constipation and had an undue heat tolerance and other evidences of hypothyroidism. On April 13, 1937, her weight was 141 pounds and her pulse 100. In July, 1937, her basal rate was minus 1 and her weight 136. In June, 1938, she completed a normal pregnancy. She seemed quite well in June, 1940, except for residual exophthalmos, and her energy was sufficient to take adequate care of her child.

At each operation the gross appearance of the gland was that of exophthalmic goitre. The appended microphotographs illustrate the differences between the appearance of the gland at the last two operations. This appears to be the only illustration of a human thyroid gland after œstrogen treatment that has been published; it corresponds closely to the picture of the rabbit thyroid gland similarly treated by Karp and Kostkiewicz. In the 1936 gland there is much more uniform distribution of colloid in the acini and the lining cells are cuboidal rather than the tall columnar seen in the earlier (1932) gland. There were many more lymph nodes throughout the 1936 gland and these were larger. There were scarcely any hyperplastic areas to be seen, in contrast to the picture in the gland in 1932, which showed many large areas of intense hyperplasia.

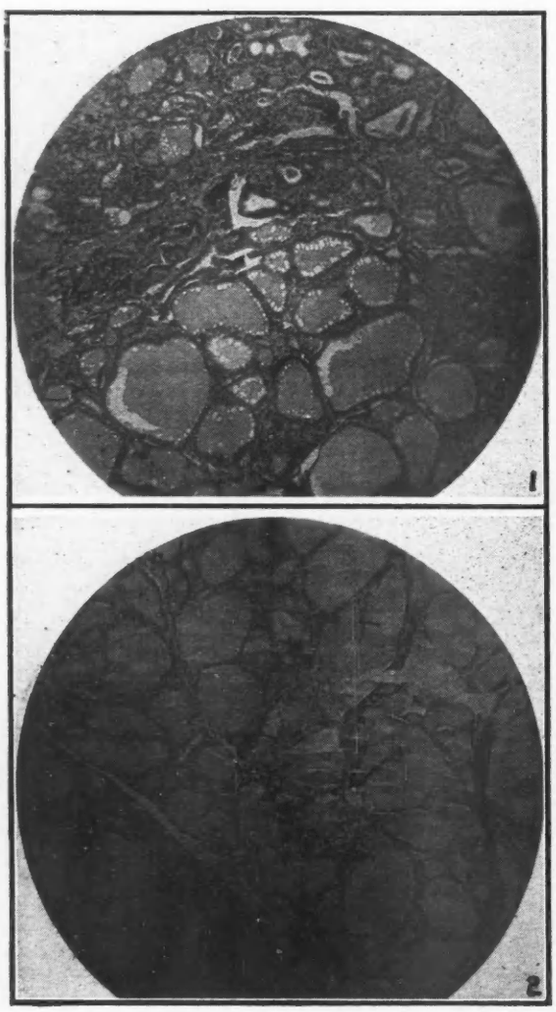

Fig. 1.—1932 gland. Fig. 2.—1936 gland.

Before our study of this case had been completed, both Spence[5] and Cookson[6] reported small series of such hyperthyroid patients treated by œstrogens. They, too, found some decrease in the pulse rate and an increase of body weight, but observed no change in basal rate, exophthalmos, size of the thyroid, tremor or skin moisture. Both concluded that there was little to recommend this therapy. Later, Donald[7] used œstrogens preoperatively on three hyperthyroid women and obtained considerable improvement as a result. Jonas and Markalous[8] reported that hyperthyroid women having menstrual irregularity had a decreased output of œstrogens in the urine and were helped both with respect to the goitre and the menses by the administration of œstrogens. Goldman and Kurzrok[9] treated seven menopausal hyperthyroid women with large doses of œstrogens. Their protocols show definite help in only one or at most two of this group. The animal work of Benazzi and others cited above has since been amply confirmed by Gessler, Zain, and Sherwood.

We have recently seen other hyperthyroid patients whose clinical histories suggest that a favourable effect can sometimes be obtained by the use of œstrogens.

CASE 2

Mrs. J.C., 50 years old. Her hyperthyroid symptoms dated back about 12 years. In May, 1936, her first thyroidectomy was done. However, by November, 1937, her symptoms had recurred, with a basal rate of plus 75, and a second thyroidectomy was performed. She then felt well until December, 1939, when she lost 14 pounds in weight very quickly and was put on Lugol's iodine, which she continued until June, 1940. She was first seen by one of us (E.V.S.) on December 9, 1940. At that time there was no palpable thyroid gland, the pulse was small and the pulse rate 104.

There was considerable exophthalmos with poor convergence and much lid lag. There was a fine tremor of the hands. She had had menorrhagia all her life, it should be noted in passing. Her basal rate was plus 45, her weight was 157 pounds, and her blood œstrogen was positive. She was given 50,000 rat units of progynon B twice weekly for four doses, despite this last finding. After each injection she felt very weak for about a day and a half, and became equally apathetic mentally. Then she was put on two milligrams of stilbœstrol (B. & W.) each day. She observed an increased urine output, as has been seen to occur after the administration of œstrogens to eclamptics.[10] On December 19th her weight was 162 pounds. On January 10, 1941, her weight was 166, she was very tired and depressed, but she had stopped perspiring, had much less tremor, was constipated, and had a normal pulse rate. On the 13th her basal rate was plus 22, and her weight was still 166 pounds. An attempt was made to maintain her thereafter on one milligram of stilbœstrol per day as it was suspected that the first dose had been excessive and had thrown her into too marked a hypothyroid state. She was enthusiastic about her improvement and gained three pounds which she has held since.

In February, 1941, she fractured her tibia. She continued her stilbœstrol but began to bleed vaginally. This went on intermittently until she was given an x-ray menopause on May 2nd. It was necessary to adjust her stilbœstrol dosage because of nausea, and finally it was changed to ovocylin, 0.5 mg. per day. If she got more than 0.5 mg. of ovocylin she became dizzy and more than 1 mg. of stilbœstrol she was nauseated. She felt very, very weary all the time, but could tolerate the hottest summer weather without discomfort. Her weight remained at 165. Her basal rate on June 9th was plus 11. Her pulse rate varied greatly, from 90 to 150. She was digitalized finally, but the pulse was still very erratic and variable. There was no further vaginal bleeding and no subjective menopausal reaction to the x-ray treatment. Her blood pressure throughout remained at about 190/90. On July 7th her basal rate was plus 30, and she said she felt "too tired to live". She contended that the lack of energy was worse than the palpitation and heat intolerance of her worst hyperthyroid state. She was told that she must make that choice.

CASE 3

Mrs. W.H., aged 62 years. She had had increasing evidence of recurrent hyperthyroidism for three years past together with a weight loss of 10 pounds. She had had x-ray therapy to the thyroid gland in 1927 and had experienced considerable relief thereafter. She was first seen by Dr. C. K. Stuart on January 14, 1941, complaining of an itchy area of psoriasis on the right lower leg. At that time she had dyspnœa on exertion, had had constant palpitation of the heart for the previous three years (worse in the last six months) and definite heat intolerance. She flushed readily and felt weak. She had no exophthalmos. Her blood pressure was 220/118 and her pulse rate 108. Her heart was enlarged to the left. Her hands were always warm. The thyroid gland was bilaterally enlarged and the lower poles could not be felt on either side. There was a tendency to stare and a fine hand tremor. There was slight œdema of the legs. Her blood œstrin was positive, her basal rate was plus 35, her white count 3,500, and red count 3,900,000. Her weight was 122 pounds.

She was given 50,000 international units of progynon B intramuscularly and then put on two milligrams of stilbœstrol per day for six days, with one milligram a day thereafter. On February 4th her weight had risen to 129, her pulse was 86 and her blood pressure 230/108. She said she felt stronger and had lost the palpitation of the heart she had felt steadily for months past. Her hands were cold and dry. She was given Lugol's iodine, ten minims three times a day. Her improvement has been maintained since.

CASE 4

Mr. G.P., aged 29 years. This man was first seen April 15, 1941, giving a history of tremor, increased nervousness, palpitation of the heart, great fatigability, insomnia, and great heat intolerance, dating back a little more than a month. He had nycturia twice a night, polyuria and increased thirst. He had lost 20 pounds weight during this time, although his appetite had become enormous. His previous medical history was unimportant. Examination revealed nothing beyond some lid lag, a diffusely enlarged thyroid gland of about twice the normal size, a pulse rate of 120, blood pressure of 140/80, and a coarse tremor of the hands. There was nothing abnormal in the urine.

On April 22nd, a basal metabolic rate done at the Guelph General Hospital measured plus 42. His blood œstrin was strongly negative. His temperature occasionally rose to 99 during his nine days' stay in hospital under observation. His pulse fell to 90, his weight remained constant, he began to sleep well and lost some of his tremor in the hospital. His only treatment during this period was with 5 mg. of stilbœstrol per day. He was nauseated on this dose and so was given ovocylin, 4.0 mg. per day, instead; 30,000 rat units of progynon B seemed to have about the same effect as this huge dose of oral œstrogen. On May 1st, when he was discharged, his basal rate was plus 24.

He was readmitted May 12th for thyroidectomy. He had continued up till this time to take his daily ovocylin (œstrone). His pulse was 125. He had gained 8 pounds of weight. He seemed to be in good preoperative condition. On the fourth day after admission he suddenly developed a left lower lobe pneumonia. In the next five days his ovocylin was stopped and sulfathiazole controlled the pneumonia. Indeed in 48 hours after it was first given his temperature returned to normal and his pulse fell to 90. The thyroid gland shrank to about 50 per cent in size and became definitely nodular, his tremor and nervousness improved and he was discharged, since operation seemed unnecessary and even hazardous, on May 22nd, with a basal rate of minus 2.

He has been seen weekly since that time and has made slight, steady improvement. His daily ration of ovocylin is unchanged. On July 16th he returned from a vacation during which he motored over 1,000 miles and camped in his own trailer. He gained 5 pounds, felt much improved, had a pulse of 90 to 100, a slight tremor—and his thyroid gland felt normal in both consistency and outline!

DISCUSSION

All of these cases were ambulatory throughout our observation of them. Three had undergone previous unsuccessful surgical or roentgenological procedures, and presumably could be regarded as unusually difficult problems. The doses used in all but the last case were not huge and the clinical improvement was very prompt. Two had recently or concurrently had Lugol's iodine, but although this is unfortunate from the viewpoint of the observer, the clinical effect produced was very obviously not ascribable to the use of the iodine and occurred much too rapidly to be due to that. There was no change in exophthalmos and other eye symptoms or in any hypertension which existed, but all other symptoms and signs of hyperthyroidism subsided partially or completely. Two of these

patients already had high œstrogen values; apparently this was a compensatory effort of the organism in order to adjust itself to the thyroid assault upon it. The second case had demonstrated this high œstrogen level clinically for years both before and during her surgical phase by her consistent functional menorrhagia. We merely lent Nature help by raising the œstrogen level of these people still higher.

The second case must be regarded as a therapeutic failure; there were so many economic and domestic difficulties coincident with the residual hyperthyroidism that one could never tell what was thyroid improvement and what was less unhappiness, or what was dejection and what was weakness from overtreatment.

It is difficult to ascribe the regression of the thyroid gland in the fourth case to either the œstrogens administered or to the drug used in treating the pneumonia. However, it is obvious that the œstrogens used had improved the hyperthyroid state even before the onset of the pneumonia. Further experience must settle the other problems raised by this unique case history.

The microscopic picture of the œstrogen-treated human thyroid appears to be so closely parallel to corresponding animal findings that there is good reason to expect that the clinical improvement secured in the human should be as thorough and prolonged as that seen in animals, if treatment is continued. All or nearly all endocrine therapy, of course, as in diabetes for example, needs to be kept up almost indefinitely to effect "cure".

It would seem that the therapeutic method used in this small group deserves further trial, at least in the preparation of hyperthyroid patients for operation, and in the pregnant woman where surgical complications are especially undesirable. It might be suggested here that the increased blood œstrogen level characteristic of advanced pregnancy may serve a useful purpose in controlling the tendency to hyperthyroidism suggested by the rise in basal metabolic rate in late pregnancy. It is remarkable that the latter so very rarely gives evidences of clinical hyperthyroidism.

SUMMARY

Three out of four hyperthyroid patients treated with œstrogens were improved.

The authors thank Dr. L. J. Fallis, Superintendent of Victoria Hospital, London, for permission to publish the case report of Mrs. J.J.; Schering's (Canada) for the progynon B; British Drug Houses of Canada for the stilbœstrol; and the Ciba Company for the ovocylin used in this study. Dr. G. K. Wharton collaborated in the management of the first case, and we are indebted to Dr. C. K. Stuart for the record of the third case.

N.B.—Patient 2 on November 10, 1941, had a blood pressure of 190/76. She had tried to stop her stilbœstrol but found she felt worse and returned to it. She felt fairly well thereafter.

Patient 4 is now doing very heavy manual labour as a welder.

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COST OF LIVING IN GERMANY.—According to the official index for the cost of living in Germany (*Dtsch. med. Wschr.*, September 26, 1941, p. 1074) during July the prices of goods in daily demand were 1.5 per cent higher than in June. This increase is attributed to seasonal influences. The figure for the total cost of living in July was 136.1 (taking the cost in 1913-14 as 100) as against 134.1 for June. The figure for food rose from 130.6 in June to 134.2 in July—an increase of 2.8 per cent. This was ascribed to the more general use of new potatoes which were of course dearer than the old ones. The price of other fresh vegetables also increased. The cost of clothing rose from 158.1 in June to 158.7 in July—an increase of 0.4 per cent.—*The Lancet.*

CIRCULATORY FAILURE IN ACUTE GLOMERULONEPHRITIS*

By RUSTIN McINTOSH

New York

CASE REPORT

A seven-year-old coloured boy was brought to the pædiatric clinic in February of 1938 because of generalized swelling of the body, which had begun with puffiness of the face a week previously and had gradually extended and increased. Four days after the onset of œdema the boy's urine had been grossly bloody, and had continued so during the three days prior to admission, though with diminishing intensity. The whole episode had been preceded by a painful attack of pharyngitis, accompanied by swelling of cervical lymph nodes.

The diagnosis of acute glomerulonephritis was pretty obvious from the historical evidence alone. The patient appeared only moderately ill, was fully co-operative and in no obvious distress; his temperature, pulse rate, and respirations were normal. The tonsils were enlarged and several non-tender cervical lymph nodes could be felt. The heart was not enlarged to percussion, the sounds were of good quality, and there were no murmurs. The blood pressure was elevated, systolic readings of 152 and 160 millimeters of mercury being obtained in the two arms, with diastolic pressures of 110 and 128. The liver was large, extending 9 cm. below the costal margin in the right midclavicular line, 7 cm. on the left. Subcutaneous œdema was detectable in all parts of the body, quite evenly distributed; no signs of ascites or of pleural effusion could be made out.

The patient's urine was smoky, and a moderately heavy sediment settled out on standing. It was acid in reaction; specific gravity 1.010; albumin two plus; no sugar or acetone; benzidine test, four plus; red blood cells covered the entire field in the microscopic examination, with a few scattered white cells but no casts on the first examination. The blood showed a slight anæmia of 12.8 grams of hæmoglobin, 3.8 million red cells, 7,600 white cells, of which 59 per cent were polymorphonuclears, 40 per cent lymphocytes, and 1 per cent monocytes. There was no sickling of red cells. The sedimentation rate was 25 mm. in one hour. Blood non-protein nitrogen measured 35 milligrams per 100 c.c.; serum albumin 3.9 grams per cent, globulin 2.6 grams; serum bilirubin was at a level of 0.27 milligrams per 100 c.c. The tuberculin test and the Kline test were negative. An electrocardiographic tracing showed no abnormalities, but in an x-ray film of the chest made two days after admission the cardiac shadow was found grossly enlarged, the cardiothoracic index being calculated at 0.60, a value well beyond normal limits for a boy of seven years.

The child's course was afebrile throughout. Since he did not seem symptomatically disturbed, in spite of the objective evidences of circulatory failure, and since there was no impairment of appetite and no vomiting, he was put on only the mildest measures. He was of course confined to bed, but was allowed a soft diet without limitation of fluids, and neither morphine, oxygen nor digitalis was resorted to. His progress can be followed with the aid of a diagram (Fig. 1). Magnesium sulphate in 50 per cent solution was administered by mouth daily for six days in the quantities charted, without producing diarrhœa. Diuresis began almost at once, the amount of urine passed exceeding the fluid intake for the first four days, and the weight curve promptly fell off at a satisfactory rate. Within two days both the systolic and diastolic blood pressures had commenced to drop. At the same time there were significant indices of improvement in circulatory function: the liver receded, the venous pressure returned toward normal levels, and the heart diminished in size. A second chest film taken five days after the first one showed a reduction of 1 cm. in the total transverse diameter of the heart, a fall of the cardiothoracic index from 0.60 to 0.52, and resumption of a more normal outline of the heart shadow. Before the end of the first week in hospital the patient felt well enough to scramble about in his bed, and after a few more days, when a more or less stationary weight level had been reached, all evidences of circulatory failure had disappeared completely. The urinary findings ran their usual course, albuminuria persisting and leukocytes and casts appearing in larger numbers as the gross aspect of the urine changed from smoky to cloudy. During the fourth week in hospital the patient's tonsils and adenoids were removed, *S. hæmolyticus* being cultivated as the predominating organism from a sectioned tonsil. The patient left the hospital as an ambulant convalescent after a five weeks' stay, and continued to improve without incident. Some seven months after the onset of his illness all trace of nephritis, as well as of cardiac insufficiency, had disappeared.

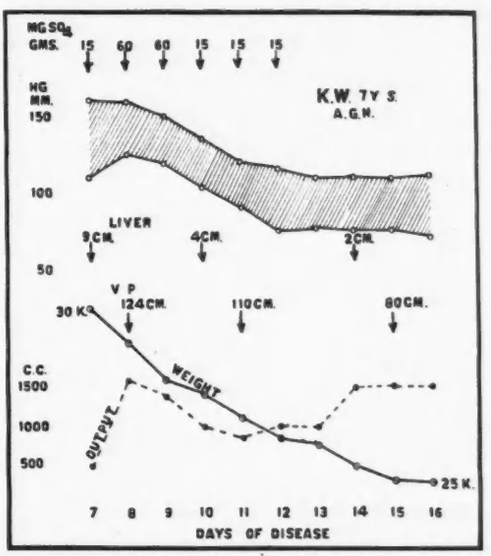

Fig. 1.—Course taken by arterial pressure, venous pressure, liver enlargement, body weight and urinary output during recovery from circulatory failure in acute glomerulonephritis.

The case is presented for an obvious purpose, namely, to emphasize the picture of circulatory failure sometimes encountered as a complication of acute glomerulonephritis, especially in its early stages. Circulatory embarrassment is a not infrequent accompaniment of acute nephritis, and is probably the commonest cause of death in cases which prove fatal during the first week or two of the disease. Milder degrees of

* From the Department of Pædiatrics, Columbia University, and the Babies' Hospital, New York.

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failure are familiar to all. The exact frequency of this complication is difficult to evaluate, since this depends so largely on the avidity with which evidence for it is sought and the variety of diagnostic instrumentalities applied.

The circulatory component of the symptomatology of acute nephritis has been known for more than fifty years, but not until the past five years or so has the attention been devoted to it which it doubtless deserves. Credit is commonly given to Goodhart[5] for first calling attention, in 1879, to the occurrence of cardiac failure in the early stages of acute nephritis. Volhard and Fahr,[12] in their comprehensive monograph published in 1914, emphasized the frequency with which dyspnœa, orthopnœa and pulmonary œdema—all of them symptoms which should attract immediate attention to the circulatory rather than to the excretory functions—were encountered in cases of acute nephritis. From time to time isolated authors gave evidence of awareness of this syndrome, notably Levy[8] in 1930, Fishberg,[3] Franke,[4] and a scattering of French and Italian clinicians. But as one scans the literature of nephritis, a more widespread attentiveness to the circulatory complications begins rather suddenly to be apparent around 1936, as though the clinical world suddenly awoke to a recognition of the obvious; and since that time all clinics have found it expedient to take stock and to view the clinical features of acute nephritis from other points of view than the kidney, the urine, and retention products in the blood.

In a series of 55 cases of acute nephritis observed by Rubin and Rapoport[11] during a four-year period from 1932 to 1936, 14 examples of myocardial damage were found; and of these, 12 showed congestive failure of some degree, which in two cases was fatal. Their paper, published in 1938, served to direct the attention of American pædiatricians especially to this aspect of nephritis; but their proportion of patients showing clinical evidence of cardiac damage was small—around 25 per cent—in comparison with other series reported since then. Hayman and Martin,[7] of Cleveland, found evidence of cardiac involvement in approximately half of their cases, their series comprising 77 patients, most of them children or young adults. Master, Jaffe and Dack[9] claimed an approximately comparable incidence; Lyttle, whose observations from the Babies' Hospital in New York refer exclusively to children under thirteen years of age, puts the proportion at more than half; but Longcope and his colleagues, after reviewing a large series of 138 patients, describe clinical evidence of circulatory insufficiency as occurring in 71 per cent, and thus include myocardial damage as an integral part of the illness, rather than as an occasional and more or less accidental complication.

We may look for evidence of damage to the circulatory system in purely morphological observations made at autopsy, in the clinical picture, and in the results obtained from accessory diagnostic aids. Immediately one is struck with the meagre scope of the post-mortem changes in the heart and vascular bed reported by pathologists, and it is obvious that, aside from cardiac dilatation, anatomical evidence of myocardial damage may be entirely wanting, even in patients who have died of circulatory failure in acute nephritis. Of three cases coming to autopsy at the Babies' Hospital in New York under clinical circumstances of this type, only one showed pathological findings in the heart accountable for circulatory failure; the hearts of the other two patients were histologically normal. From other sources in the literature observations are reported of myocardial change visible in fatal cases of scarlet fever, but these are not necessarily the ones suffering from post-scarlatinal nephritis.

Brody and Smith,[1] describing the visceral changes in scarlet fever and related streptococcus infections, refer to a variety of cardiac lesions. The fact that these lesions are not confined to cases of scarlet fever but are also encountered in patients whose infection was caused by a non-scarlatinal type of streptococcus (according to the terminology of the day, their article having appeared in 1936) leaves the path open for streptococcal disease as such (and acute glomerulonephritis is now recognized to be a streptococcal disease) to affect the heart directly. The types of change which they found were, first, focal or diffuse infiltration of the myocardium having no apparent distribution with reference to the cardiac blood vessels; second, infiltrations of mononuclear cells in or about the smaller coronary arteries, producing the picture either of arteritis or of periarteritis; and third, subendothelial infiltration of the endocardium or of coronary veins, this last being the most common of the three types of lesion. In other words, they found two of the three underlying

lesions in fatal cases of hæmolytic streptococcal infection to represent vascular injury with a concurrent perivascular or mural round cell infiltration. One is tempted to jump at once to comparison of these changes with the better known rheumatic lesions. Coburn[2] has shown that in fulminating cases of rheumatic fever, fatal early in the first attack, widespread vascular lesions are found in various organs and systems of the body, lesions which are unquestionably an expression of the disease but which, possibly because of their immaturity, lack the identifying characteristics of specific rheumatic lesions such as the Aschoff body. McCulloch, in discussing the paper of Rubin and Rapoport already mentioned, was willing to bind all these strands together as different manifestations of a common etiological agent, the hæmolytic streptococcus; but this controversial question must still be regarded as unsolved. Whatever the relationship of glomerulonephritis to vascular disease may ultimately prove to be, it is evident that the relative infrequency of clear-cut anatomical changes at autopsy in the hearts of patients dying of acute nephritis played an important part in the past in delaying clinical recognition of the realities of the situation.

The symptoms which most commonly direct attention to circulatory failure in acute nephritis are dyspnœa, tachypnœa, cough, and a sense of oppression. The list of physical findings which one may encounter is longer and more varied, and includes cardiac enlargement detectable by percussion or by palpation; increased intensity of the heart sounds or, in a few cases, just the reverse—a muffled quality; a rapid pulse rate; the development of a cardiac murmur not otherwise explained, usually systolic in time and devoid of any particular intrinsic characteristics; gallop rhythm; venous engorgement, especially in the neck; enlargement of the liver, with or without tenderness; râles at the bases of the lungs; and sometimes, in retrospect, peripheral œdema which can with some reason be ascribed to circulatory failure rather than to the nephritis itself. In marked cases of circulatory failure all of these changes are present and many of them are of marked degree; but in the mild cases they may be either wanting entirely, or may be so masked by the symptomatology of the nephritis itself that recourse must be had to other devices for indicting circulatory function.

Probably the most subtle changes are those shown by the electrocardiogram. These may take a wide variety of forms; among them, low voltage of the P-wave, prolongation of the conduction time, depression of the P-R segment, low voltage in the QRS, left axis deviation, and various abnormalities of the S-T segment and of the T-waves themselves. At times these are the sole evidences of cardiac abnormality. On the other hand, they may be present in only mild degree in clinically severe cases. Measurement of the size and shape of the heart by roentgenogram is often of the greatest importance, and its validity is enhanced when the heart shadow is seen to diminish in size with progressive symptomatic improvement. Other devices for assessing circulatory performance, such as measurement of the venous pressure, the circulation time or the vital capacity of the lungs, may not prove applicable in patients younger than about eight years of age, though here again they may have great value if it is possible to make repeated observations throughout the course of the attack.

It is evident that up to the present time attention has been focussed principally on those changes which primarily incriminate the heart as an organ designed to do mechanical work. Probably more attention could with profit be paid to the vascular bed itself. Most of these patients, of course, have arterial hypertension. It was customary in the past to view this as the direct result of interference with urinary excretion and as the immediate cause of cardiac decompensation from the purely mechanical effect of a sudden increase in the work-load of the heart. Obviously, the situation is far more complicated than this. It has now been shown beyond reasonable doubt that the hypertension of acute nephritis depends on widespread arteriolar spasm, for it is dramatically relieved by intravenous or intramuscular injection of magnesium sulphate. The underlying effector mechanism remains unknown and is one of the most intensively cultivated areas of the field of physiology today. But without attempting to unravel the pathogenesis of vasospasm in nephritis, one may profitably call attention to other aspects of vascular involvement; to the established fact that widespread vascular lesions have been described, as mentioned above in recounting the work of Brody and Smith, and that the permeability of the peripheral vessels appears to be altered throughout the body in the course

of acute nephritis. In the mildest cases this expresses itself as an increased permeability to plasma proteins alone. Fishberg, Peters and others report analyses of the protein content of œdema fluid in acute nephritis and find it well above the level of a simple filtrate through intact endothelium. The conclusion seems inescapable that acute nephritis is associated with increased capillary permeability. At times it is possible to demonstrate capillary damage by the application of negative pressure to the skin, with a larger score of petechial hæmorrhages than should normally be observed at standard pressure levels. In a few cases scattered skin hæmorrhages of apparently spontaneous origin have been described, and the occurrence of retinal hæmorrhages and exudate, although rare in children and rare likewise early in the disease, must when present denote vascular injury.

In the presence of acute glomerulonephritis the diagnosis of circulatory failure presents no real difficulty, provided the likelihood of its occurrence is borne in mind and provided adequate measures are taken to assess its severity. Even though the mildest cases may escape detection without special diagnostic aids such as the roentgenogram and electrocardiogram, in moderately severe and in severe cases full justice can be done both to the patient and to the clinical situation by competent use of the eye, ear and hand unfettered by the shining gadgets of modern technology. The signs to be looked for have already been enumerated. Real diagnostic difficulty may be encountered when a patient turns up with a fulminating attack of rheumatic carditis, especially if it is his initial attack and if arthritic manifestations are lacking. These patients invariably show oliguria, signs of renal irritation, and circulatory failure, and may also simulate the primarily nephritic picture in other ways. Differentiation is important from a prognostic point of view, even though a single therapeutic program may suffice for either. The course of rheumatic carditis identifies it eventually, though the initial diagnostic difficulty may persist for a number of days.

The course of circulatory failure developing as a complication of acute nephritis is difficult to describe in specific terms. In some instances, as has already been pointed out, it is the direct cause of early death. As a rule, however, the attack is survived, is not renewed, and leaves no permanent residua. Alarming degrees of cardiac enlargement, of liver engorgement and even of pulmonary œdema may persist for several days and yet eventually subside entirely, though the heart may not return to its normal size for some months, or even for a whole year. The risk to life in a given case is by no means proportional to the severity of the nephritis itself, as measured by the urinary findings, nor is the degree of circulatory failure strictly and invariably proportional to the height of arterial hypertension, although a rough parallelism in this respect has been described by most observers of experience. The prognosis of the circulatory failure in a given case is immediately proportional to the symptoms of circulatory failure.

Treatment must be largely symptomatic and is by no means standardized. All will agree, of course, on the urgent necessity for adequate physical and emotional rest. Morphine may be needed, and restriction of fluids should not be abused to the point of increasing the patient's discomfort. Little is to be expected from measures directed at critical diminution of the total blood volume, and in the presence of oliguria vigorous attempts to promote diuresis may do more harm than good. We have had good reason to pin our faith largely on efforts to keep hypertension within reasonable bounds by adequate administration of magnesium sulphate, intramuscularly at first and in repeated doses, later, by mouth and more at leisure as the threat subsides. Administration of oxygen promotes the patient's comfort, especially in the presence of pulmonary œdema. The part played by digitalis is still difficult to evaluate. Longcope stresses its importance; Rubin and Rapoport,[11] and likewise Goodwin,[6] advocate it in all but the mildest cases. Certainly some of the severe cases have recovered without its use, but in the light of present knowledge one would doubtless feel safer in resorting to it without delay. In prescribing digitalis for nephritic patients one must, of course, keep in mind two sources of danger: calculation of the required dose must include due allowance for the excessive body weight occurring as œdema fluid; and the risk of overdosage through retention in the presence of impairment of renal excretion should likewise be taken into account.

In summary, the purpose of this paper has been to draw attention to one of the clinical features of acute glomerulonephritis, namely, the accompanying picture of circulatory failure. Although its presence is in no sense difficult to

recognize when the symptoms and signs are well marked, the frequency of its occurrence in relatively mild degree has only recently come to be appreciated, and one may fairly question whether it is always given due weight in our evaluation of a given clinical situation. Recognizing its importance in determining the outcome in some of the cases of acute nephritis which prove fatal early in the attack, we may well bear in mind in all cases—even the mildest ones—the necessity of sparing the heart any unwarranted burden.

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MODERN TRENDS IN MEDICAL PRACTICE*

BY JONATHAN C. MEAKINS

Montreal

ON looking back over the history of the development of medical art and science during the past century one cannot but be impressed by the close relationship between this and the emphasis which has been laid upon the different methods of teaching. The growth has been gradual, passing through a number of stages which may be roughly divided into three parts; first, the development of the technique of physical examination, particularly in regard to the correlation of signs elicited by auscultation and percussion with the gross anatomical lesions. Second, the period when pathological and bacteriological thought dominated the outlook of medicine; and finally, we have the period when biochemical and biophysical methods and outlook have tended to usurp the thrones of the first two. This last period has been accompanied by great emphasis being placed upon laboratory methods which have entailed the development of much mechanical assistance.

This last development has tended to draw the attention of the students and of the practitioner away from the patient as a co-ordinated, functioning animal organism. In its place one might almost say that he has been broken up into a variety of sections and that the main portion of the investigation and analysis of the patient's condition has been done in laboratories, or other places, by someone besides the medical attendant. This has been one of the greatest dangers which the teaching of medicine has had to face during the past twenty years. It has tended to make the student non-self-reliant; to make him feel that the physician's part in diagnosis and treatment of disease is of less importance than is that delegated to others who only view the patients from an electrocardiographic, x-ray, biochemical or biophysical point of view, and not as a human being.

All these forms of examination have their place in medicine, but they should be subservient to an exhaustive general examination and all that this entails. Furthermore, they should be employed to contribute confirmation, but should not dominate the teaching of medicine. The tendency to allow them undue prominence is well illustrated by the procedure adopted by many hospital interns, who will put in requisitions for a complete x-ray examination, including the chest and abdomen, electrocardiograph report, a Wassermann reaction, blood chemistry, etc., before they have even taken the history or made a thorough physical examination, which should include, of course, the examination of the urine, stools, blood,

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stomach contents, if required, and all other simple laboratory methods which they are perfectly competent to undertake. One must face this tendency to "pass the buck"—to use a slang expression—when the teaching of medicine is under discussion.

There should be a reasonable co-ordination in the general scheme of the medical curriculum. The influence of one department should not be allowed to dominate the teaching of others. A certain amount of overlapping is unavoidable; but this may be allowed if it contributes to the greater good of the teaching of the whole subject.

It has been held by many that the student should be initiated into clinical medicine and surgery as early as possible in his medical career. There is much to be said in favour of this contention; but there is considerable dubiety as to when this should be most logically initiated, as there is the important correlation of medicine with pathology on the one side, and with physiology and biochemistry on the other. It is difficult to teach medicine before the student has had at least his introductory course in general pathology, and it would not seem reasonable to discuss functional abnormalities before the student has had an opportunity of mastering the normal regulation of the body, whether it be physical or chemical. Furthermore, I have claimed that it is not the function of the physiologist or of the biochemist to teach so-called pathological physiology or pathological biochemistry. These essentially fall within the realm of clinical medicine, in fact they are medicine, and the staff of a Department of Medicine of the present day which cannot undertake this teaching is not properly equipped. A similar contention is held by the best teachers in surgery, that the teaching of surgical anatomy is not the function of the anatomist but of the surgical teacher himself.

It would therefore seem logical that as soon as the physiologist and the biochemist have finished, or are close to the completion of, their course, medicine should then take over the student and carry on the teaching of these subjects insofar as they apply to diseases in the human body. This we have found by experience to be accomplished best by starting medicine immediately after the courses in normal anatomy, physiology and biochemistry have been completed. I feel it an essential that the abnormal aspects of these subjects so far as possible—and this I believe to be almost completely possible—should be demonstrated upon the human subject. For instance, the demonstration of auricular fibrillation in an animal as compared to a human being should give rise to no difference of opinion that the latter is by far the more preferable. Similarly, the demonstration of dyspnœa or cyanosis, the occurrence of pain and its distribution, the demonstration of the different forms of jaundice, the results of disturbances of carbohydrate and fat metabolism, hyperthyroidism, hypothyroidism, and innumerable other important physiological disturbances, are well and logically shown in the human subject.

A systematic and exhaustive course of this kind I consider to be the best introduction to medicine. The student comes fresh from his biological subjects. If then the method of production and the significance of the signs and symptoms of disease are systematically discussed and estimated as they qualitatively and quantitatively disturb the human organism, we are dealing with matters which the student can understand. It appeals to him in logical sequence, and he then may obtain an intelligent perspective of the main guide-posts which are going to help him in his future career, or what one might call the technique of finding his way about in medicine.

There has been much debate regarding the value of so-called didactic lectures in the teaching of medicine. To my mind the only real objection is that these are so often given by the lecturer merely as a repetition of what may be obtained in any good textbook. This should not be so. The teacher should be able to instil into his discourse his own individuality as a teacher, to throw the subject into relief, emphasize that which is important, relegate to a proper place those points of unimportance, and all in all to bring before the student's mind as in a panorama the whole field of medicine. Such lectures, of course, should be supplemented by reading on the part of the student, and it is here I feel that we have one of the greatest problems in education and its continued progression.

I have been greatly struck by the difference between the mental attitude towards learning of students in Scottish universities and those in the universities of this country. I can only give expression to this comparison by labelling

the North American student as having, as a rule, a "newspaper mind", one that has been ruined so far as acquiring knowledge in critical reading is concerned by devoting his leisure period to the perusal of the daily press and romantic magazines with catchy headlines, and often ungrammatical and poorly written articles. He unconsciously develops a state of mind which is uncritical of what it reads, and after all may come to the opinion that reading is not to be trusted or is not a serious occupation anyhow. The Scottish students, on the other hand, have acquired a love of reading, of good English, of carefully reasoned debate. To them an opinion is an opinion and must be based upon some reasonable show of argument rather than a mere blind statement of events for which no logical argument is forthcoming.

There seems also to be another difference in the point of view of these two classes of students which manifests itself mostly towards the final years. Probably it is because at this time they are beginning to acquire what seems to them to be the "tools of their trade". The attitude of many of the students of North America is that they have paid for these tools and they wish to have them delivered as though they were hammer or saw. The attitude of the Scottish student, on the other hand, is that he pays for the privilege of going to the university, that the university gives him more than he can ever repay, and that his people consider a medical education as a luxury and as the foundation for the career of a gentleman and a scholar. The main object is not so much to make an extravagant living in the future as to hold a position high in the thoughts of his neighbours and his patients.

The student eventually arrives at a point of mental equipment where he can be left more or less to his own devices, to round off his mental edges, and devote himself to a quiet perusal and orientation of all that he has learned. Some students are capable of doing this on their own. They find this a period of great mental stimulation. They can follow pursuits in which they have an interest and at the same time allow themselves to reflect on their mental equipment and fill in the lacunæ as they may discover them. This presupposes a considerable amount of leisure time on the part of the student in order that he may devote himself to the taking of a careful history and making a careful examination. Some students work more slowly but more accurately than others, and all students cannot be treated the same. All the ordinary methods of examination should be required before any confirmation by the more elaborate methods of technique. The student should learn to be as self-reliant as possible, to come to an accurate diagnosis without an x-ray, or electrocardiogram, or chemical analysis of the blood, or an estimation of the basal metabolism. When he has accomplished all that is possible without these, then such mental luxuries and short-cuts should be made available to him in order that he may make his own interpretations. Students should be encouraged to be self-reliant practitioners of medicine and not merely "sorting agents" for the specialists. The relationship between the physician and the specialist should always be kept in proper perspective.

This period of a medical student's education is in many ways of crucial importance. He has his technique and is now being given an opportunity to employ it. But it is imperative that the technique, the faculty of reasoning, and a reasonable skepticism should be maintained; that a proper perspective should always be before his mind; that thoroughness and careful observation are as important in medicine as in chemistry or physics; that there is not only a medical art but also a medical science; that many disease entities run a definite course and that disease should be considered in its whole life history and not only in regard to today and tomorrow. In the mind of the patient prognosis is the most important factor; the diagnosis usually being of incidental interest only. Further, the basis of treatment will require a more exact understanding than that based upon a purely anatomical background. It must be exact and follow a reasonable train of proved or experimental truth.

With graduation the student is immediately transferred from the realm of the acquisition of knowledge and little experience in practice to one where there is a greater demand for the practical application of this fundamental knowledge, and he is by the nature of things much bewildered by the responsibility which may be abruptly thrust upon him. This has been a complaint which many graduates of medical schools have expressed with varying degrees of vehemence. If one looks at this situation with cool detachment there would appear to be but three solutions: first, to permit the student to

find his experimental practice upon the human animal before he is properly equipped to do so; second, to turn him over with less equipment to a general practitioner as an apprentice; and third, through a system of internships and senior resident hospital positions to guide him in the practice of medicine under critical control.

It must be remembered that the advances in medicine today are subject to two extremes. First, there is the uncritical and almost fanatical acceptance of new therapeutic measures such as the sulfonamides for infections and liver extracts in anæmias. Unreasoned application has undoubtedly done much harm; how much can never be known, as it is forgotten, if ever recognized except by the few who have the courage to publish their results. The second is the ignorance of the application of fundamental concepts of the nature of diseased processes. The practice of medicine is progressive and dynamic. It is not based upon a mere collection of facts during an undergraduate medical career. As John Stuart Mill said, "The proper business of a university is not to tell us from authority what we ought to believe and make us accept the belief as duty, but to give us information and training and help us to form our own beliefs in a manner worthy of intelligent beings; to seek for truth on all and demand to know all the difficulties in order that we may be better qualified to find and recognize the most satisfactory mode of solving them".

But the question may be justly asked, "What value is the teaching in a well-equipped hospital when in practice the doctor has not available for his use the complicated and expensive tools to which he is accustomed?" The fault should not be attributed to medical progress; it is rather due to the lack of provision of these tools to the practitioner. Such a provision I earnestly believe is the responsibility of some public authority. The medical profession has attempted to accomplish this itself by private clinics or group practice. This has succeeded on occasion, but on the whole has been of doubtful permanence because its success rested upon the drive and energy of one or at most a few individuals. Whereas in boom days it was heralded as a medical Utopia, with the first breath of adversity the system began to disintegrate or tumble to earth. In most cases it was financially top-heavy and the traffic of more sane economic times could not stand the price. But the public had tasted a sweet morsel of efficient if extravagant medical service and there has arisen slowly but surely a demand for its continuance at a price within the reach of all. The young family man of today is fully conscious of the fact that sickness is a hazard probably only second to war; also that the foremost cause of poverty and misery is ill-health. He wants a means of protection against these hazards and is going to have it, call it Health Insurance, State Medicine, or what have you.

Many of you may think this heretical, radical, socialistic, communistic, or any other of the catchwords put in minds and mouth by what we are pleased to call the conservatives, but really are those who are frightened of change. They are of the same group who opposed prison reform, asylum reform, emancipation of slaves, and other great movements which even today are not yet complete.

For the benefit of those who oppose such a movement in the practice of medicine let us review how far we have already gone upon the path of its attainment. I have reference to what may be called broadly "Health Insurance".

For five years I worked in intimate contact with a health insurance plan in active operation. I was able then to see its virtues and most of its failings, and furthermore was gratified to see—as the years passed and as the conservative attitude of both the profession and the public became more accustomed to it, and as its ramifications and organization became more complete—that it *had* to go forward and could not possibly retreat.

The responsibility for the maintenance of health rests squarely on our shoulders, individually and collectively. If we are to live up to our concept of democracy, liberty of the individual cannot be held to include danger or harm to one's neighbour either through wilful acts or ignorance. If such were included, our self-preservation and our protection would rest on compulsion and dictatorship. The essence of liberty within a democracy is that each individual shall accept the responsibility of contributing his bit to the good of the whole and no majority or minority can be a menace to the common weal.

I am afraid many have far too narrow a concept of the definition of "health". Some appear to think that it is summed up in prevention of death; others that it means the avoidance of complete physical disability, but to my

mind it has broader implications. It means to me a sound body that can carry out the task of the day, a reasonable economic standard that makes life worth living, a peaceful and normal outlook upon society—in fact, that sum-total of well being, mental, spiritual, and physical, so well typified by Longfellow in "The Village Blacksmith".

When I come to define "insurance" I am afraid that I am getting beyond my depth. One might conceive of it from two points of view. The first might be called impersonal, as exemplified by the laws which have been enacted by one of our legislative bodies for the protection of our possessions and property. We contribute to this insurance through the maintenance of police and fire services, and many people who have not complete confidence in their universal protection take in addition burglary and fire insurance. Further, in some countries, in spite of an excellent traffic control, they insist on automobile insurance. All of these are primarily designed to protect or compensate for loss of property rather than loss of health. It is true that we have life and sickness insurance and even burial insurance; but, the former is usually carried for its monetary return, payable either to one's estate or dependents, or as a nest egg for one's old age; while burial insurance appears to me to be a matter of pride and does not concern one's present existence. Sickness and accident insurance are the nearest approaches to health insurance, but unfortunately are not carried by those for whom they would be most useful.

"The fundamental concept of insurance is the co-operative association of a large number of persons who agree to share amongst themselves the burdens resulting from the occurrence of a particular contingency, such as the occurrence of death, sickness, unemployment, etc., by the payment of the necessary contributions into a common fund from which benefits, related strictly to those contributions, are distributed in alleviation of the burdens against which the insurance is effected." This definition is well known to all in the insurance profession and to my mind is an extremely good one.

Have we as a people unconsciously travelled any distance along the road to this end? I think undoubtedly we have, although we may not appreciate it. Anything which would contribute to the prevention of a particular contingency is, to my mind, a much better plan than compensation after the contingency has occurred. Such contingencies as ill-health and sickness may be combated from two directions. They are the prevention and the cure, of which undoubtedly the first is the more important. If either of these ends is to be accomplished it is necessary for us to know how health may be threatened or lost. All we need to know in the prevention of infectious diseases is the method of continuance from person to person, and a good Public Health Department, given absolute powers, can be trusted to do the rest. But a Public Health Department is greatly handicapped unless it has laws to uphold its authority and the full co-operation of public opinion. The spread of infectious diseases is assisted by ignorance, superstition, malnutrition and overcrowding.

Another great cause of physical illness is nutritional deficiencies. This is primarily an economic problem. The minimum wage should not be based upon dollars and cents as such but upon the requirements of a healthy standard of living in regard to food, housing, and recreation. The incidence of mental and physical ills will rise in inverse ratio to this level. The enactment of unemployment insurance is undoubtedly a step towards this end and will be successful provided the returns to the unemployed individual are sufficient to accomplish the needs just mentioned. If they are not, it is obvious that they will not fulfill the purpose of this Act.

The problem of mental diseases is one of the most pressing of our time. You will appreciate this when I tell you that in some parts of this country we send as many young people to mental hospitals as we do to the universities, and spend three to four times as much upon them. Over 50 per cent of all hospital beds in this country and in the United States are occupied by neuro-psychiatric disabilities. Each of these cases costs the State, or Province, about $7,000 a year.

There appears to be a rather fatalistic attitude in the minds of most people as to the possibility of alleviating this catastrophic condition of affairs. It is true that we cannot give the assurance in regard to these that we can to those ills due to infectious agents and the deficiencies of nutrition; but much can be accomplished towards their prevention. If we spent the annual cost of ten of these patients per

year for every 100,000 of our population or fraction thereof, we could strike at the root of most of them during childhood or early adolescence by the further development of mental hygiene and our Juvenile Courts. Further, if we had compulsory laws that could be enforced for the isolation and treatment of the syphilitic, an important cause of adult insanity would be removed.

Industrialists I think will agree with me that prevention is much better than compensation. From industries there used to arise one of the largest causes of physical disability, namely, accidents due to fatigue, carelessness, unprotected machinery, and other industrial hazards which have been conspicuously reduced in the past twenty years. The studies on industrial fatigue and education of workmen have gone far to make the Workmen's Compensation Act a success.

There remains for me to mention briefly now a large section of physical and mental disabilities that arise from cardiovascular diseases and what one might also call senescence, amongst which cancer is one of the minor. We perhaps have brought much of the increase of these diseases upon ourselves, as people live longer. In fact, the life expectancy at birth is going up steadily, and we have been forced to recognize this by the institution of old age pensions which are fundamentally an insurance against starvation and lack of a roof over one's head when through the passage of time and senescence we no longer are able to compete profitably in the general labour market.

There is no doubt that the cost of medical care has increased enormously in the past fifty years, but so has its efficiency, as reflected in the decline of epidemics and the increased expectancy of life. But there is also no doubt that it is not equally distributed nor are the facilities uniformly available. This has in a great part been met in the larger centres by our Boards of Health who now provide in many places a free Wassermann service, free x-ray examinations for diseases of the chest, free bacteriological and other diagnostic methods. All of these are paid for by the tax-payers' money, which is as it should be, because they are designed to prevent the spread of disease. I stress these matters so as to throw into relief the fact that for some unknown reason we balk at health insurance to protect the individual against that particular contingency which may carry in its train sickness, unemployment and death.

This subject has not been neglected either by the medical or actuarial professions, or by some of our governing bodies, and I know that it is close to the hearts of many of you. The Canadian Medical Association and certain of the Provincial Associations have studied the matter for over ten years and have brought in some excellent reports. In fact, in some of the Provinces they have made feeble attempts to implement it, as in British Columbia a compulsory Health Insurance proposal was withdrawn but at the present time a voluntary insurance plan is being tried in greater Vancouver and New Westminster. In Alberta a compulsory scheme was suggested in 1935 but this has also now been abandoned. In Saskatchewan there has been a wide development of the municipal doctor plan through legislation designed to encourage a form of "municipalized medicine" sponsored and supervised by the Provincial Government. In Manitoba the municipal doctor plan has likewise been prominent. In your own Province there has been established in ten centres a voluntary insurance plan through the "Associated Medical Services Incorporated", and by the Hollinger Employees Medical Services Association of Timmins, and another plan in the Windsor area, while your Medical Association since March of 1935 has been administering a Government-sponsored plan for providing medical care to relief recipients throughout the Province. In Quebec the development of "Health Units" has progressed widely, existing in fifty-three of its ninety counties; while in the Maritime Provinces a form of Health Insurance called "Medical Contract Practice" has been operating amongst the mining companies' employees for many years.

A notable growth has taken place recently in Canada as in the United States of plans for hospital insurance only. The funds provided by this hospital insurance usually cover the cost of semi-public or semi-private hospital accommodation for not more than a limited number of days, with general nursing care, operating and case room services, etc., and undoubtedly is meeting one of the major financial problems of sickness. They make no attempt to include the more elusive and widely varying costs of the general practitioner, specialist or consultant, surgeon, special nurses, etc.

So you see that there is undoubtedly a striving towards insurance to meet the burdens resulting from the occurrence of the particular contingency of sickness. These experiments would all seem to suggest that there was dubiety as to a proper solution. You will note that these schemes rest on one or other of two foundations, either the municipal doctor, who is really a full-time employee of the State or Municipality, or the more elastic plan of insurance whereby the beneficiaries contribute so much per unit of time with or without contributions from the employer and the taxpayer.

Under the scheme of the municipal doctor the service is all-inclusive except for those advantages provided by hospitalization. In any health insurance plan there are a number of details which are of prime importance; voluntary versus compulsory insurance on the part of the insured, and remuneration to the patient of either cash-benefits or benefits-in-kind (including medical care, surgery, hospitalization, drugs, etc.).

I am jealous of the rights and reputation of our profession but am fully conscious that we have also a responsibility towards the public. Under the cash-benefit system the doctor usually has to certify as to the character and duration of the illness. His certification is then scrutinized by the claims department to verify admissibility of the claim. The doctor then receives payment for his services from the *insured person* and not from the officials of the insurance plan. Under the benefits-in-kind system the doctor's position is different. He must again certify the illness and his certification will be scrutinized, but he receives his payment from officials of the insurance plan and not from the insured patient who receives the benefit.

There is in addition a third scheme operative in Great Britain where the insured person can elect to be attended by his own doctor, while the doctor has the option of accepting such a patient, and in order that he may not have too big a panel to look after, the number of his acceptances is limited. He receives so much per annum per person on his panel irrespective of whether the person be sick or well, with extra allowances for drugs and travelling expenses in rural districts. This scheme had certain drawbacks in its early stages. There was no allowance made for dental care, for consultative service, for laboratory service, or hospitalization; but, as the years have passed many if not all of these omissions have been rectified and there is no doubt today as to the solvency of the health insurance scheme in Great Britain. And more important, perhaps, the people of Great Britain and the profession would not return to the situation of twenty-five years ago.

Which is the best plan to follow is not for me to express an opinion. I am not an actuary so am incapable of expressing any opinion on the financial side. I know that there is much misconception in the minds of our profession as to what this means and I am fearsome that they will continue being confused by many tongues, or, what is worse, being totally indifferent, until the time arrives when public opinion will recognize its responsibility in health insurance and will insist upon some form being instituted which may be hastily conceived and unjustly operated.

You will note that each province is seeking a solution on its own and one hears constantly that this must be a provincial affair because the British North America Act so states or implies that it is a provincial right. It is true that the British North America Act is a great charter, but it was enacted in 1867, approximately seventy-five years ago and "much water has run under the bridge" since that time. A man may be just as sick in Hull as in Ottawa, or vice versa. Those of us who think that health insurance should be a national project believe that our Canada is a unit, and migration from province to province should not carry with it exclusion from these fundamental social benefits. We do not want to take anything away but rather we want to give. The world rolls on. We do not now hang a man for stealing a sheep for food, nor because he cuts a limb from the King's beeches for firewood. Men and manners change. The demand for health security is at our door. I urge that the medical profession must lead through our responsible organizations. But too many of our members live in the past and will not see "the writing on the wall". Hope for its just solution in the near future rests on a tri-partite basis consisting of the beneficiaries, the contributors, and the medical profession who would carry the burden of its fulfillment. Social security can never be obtained unless the fear

and hazard of physical and mental incapacity be insured against.

Many of you will claim that to practise medicine today according to the precepts and teaching of our medical schools the profession in general and the family practitioner in particular must be provided with better facilities to carry on his work. With this I entirely agree. Many far-sighted practitioners have at considerable cost to themselves equipped their offices with useful appliances as well as many useless gadgets. The latter are more in the way of window dressing but have a good revenue value and help pay for the former. We must be true to ourselves and acknowledge that there have grown into modern medicine some practices which smack of what is commonly called a "racket". I have a sneaking sympathy for those who unknowingly become so involved, but none for those who do it with malice aforethought.

But be this as it may, what is the solution? I have already mentioned that public money provides x-ray, bacteriological and serological services and supplies protective and curative agents such as smallpox vaccine, diphtheria toxoid, insulin, arsenicals, etc. But why not extend this still further and provide to the practitioner and the patient all the advantages of modern medicine? It would be economical in the end. It is feasible even in the backwoods with proper organization.

This war is going to wreak havoc in many of our old habits of life and in none more than in the practice of medicine. Let us for a moment consider Great Britain! There is little doubt that Harley Street with its swank and charlatanism is a thing of the past. The Emergency Medical Service functions like clock-work and the medical profession is pulling its full weight in the boat of national effort. Their heads are up and the people of Great Britain have a medical service such as was never thought possible. A few rough edges are to be filed off, but the spirit and accomplishment is a triumph.

Some months ago I was in a South-eastern State and was surprised to hear that the old-time rural practice in the minds of those competent to judge is a thing of the past. The present generation of doctors, patients, and social services will demand a "new deal" with an up-to-date stream-lined pattern. It is just and proper that such should be the case. We talk of public services in other things such as electricity, in which you are leaders, so why not in medicine? We should not lose our dignity if we entered into a co-operative service with the people to provide an efficient and up-to-date progressive medical service.

We must make a distinct difference between a service and a professional opinion. The latter requires the former and so it is with such therapeutic procedures as surgical interference. There can be no difference between medical and surgical diagnosis except that the first is comprehensive and the latter strictly regional according to the therapy indicated. But these matters are changing! The surgeon who tries to treat diabetes with insulin, pernicious anæmia with liver extract, and pneumonia with sulfonamides, are not unknown amongst us,—nor is the physician who treats hyperthyroidism with excessive amounts of iodine, gangrenous appendicitis by cathartics, and cholelithiasis as coronary thrombosis. So let these artificial barriers be lowered and use all methods at our disposal to arrive at truth, and so lead the practice of medicine into a happier and better realm. Those who are specially equipped will have their proper place in the camaraderie of our fraternity but must not abrogate to themselves a place of almost arrogant superiority with limited responsibility unto their profession.

The practice of medicine becomes simpler as truth is approached according to our present knowledge, which is surely dynamic and never can be static. So in our practice as in our knowledge let us be progressive and forward, to keep pace with the social readjustments of our times!

I think as much as anything, the young doctor entering the Service fears stagnation. He sees himself assigned to Camp Pocket on tour of duty between the bunk house and the latrine, marooned on post amid acres of intellectual and physical mud. Such things do happen, but men have been known to live them down and emerge famous.—*The Diplomate*, 1942, **14**: 20.

Everyone is forward to complain of the prejudices that mislead other men or parties, as if he were free and had none of his own. This being objected on all sides, it is agreed that it is a fault and a hinderance to knowledge. What is the cure? No other but this—that every man should let alone others prejudices and examine his own.—John Locke.

THE EXTERNAL USE OF SULFONAMIDES IN DERMATOLOGY

BY FREDERICK KALZ, M.D. AND MARTIN V. H. PRINZ, PH.D.

Montreal

THE sulfonamide compounds have revolutionized the treatment of many medical and surgical diseases. Their usefulness in the treatment of skin diseases is not yet generally recognized, although curative effects by oral application have been reported by Hughes,[1] Beinhauer, Knoll and Perrin,[2] Combes and Canizares[3] and others. Most authors think it inadvisable to use the sulfonamides internally in harmless and self-limited skin conditions.[3]

Experimental work has proved that sulfonamides are evenly distributed throughout the body when given internally. The concentration is believed to be somewhat lower in the brain and skin.[4] It does not seem reasonable to saturate the whole body with a sometimes dangerous drug in order to obtain the necessary concentration in some limited part of the skin. Local application seems to be the logical way to achieve this concentration.

The sulfonamides are effective if applied locally to the site of the infection and in some instances, local rather than oral therapy gave better results.[5]

Attempts have been made to find some method of applying the drug externally in skin diseases. Jaeger and Hillmer used prontosil and uliron in powder form. Gatè and his co-workers used septazine and reported good results, Schnieper[6] used 5 per cent sulfathiazole in a greasy base with good results, admitting, however, that greasy ointments are contraindicated in pyodermic skin affections. MacKenna used sulfapyridine powder and Spink and Paine 1 per cent sulfanilamide incorporated in cod liver oil; Brunsting, a 4 per cent sulfanilamide ointment, and Sams and Capeland[7] recently reported satisfactory results using 5 to 20 per cent sulfathiazole in different non-specified bases. As routine treatment they used a 30 per cent sulfathiazole suspension in cod liver oil. Robson and Wallace[8] used the following procedure in order to avoid a greasy base: 5 grams of albucid were mixed with 100 c.c. of glycerin, heated and dissolved; 10 grams of cod liver oil were added and the liquid mixed with 80 gm. of kaolin. The resulting paste contained a 2.5 concentration of the drug.

Lain[9] used a 30 per cent suspension of sulfanilamide in glycerin and reported better results with this base than with any greasy ointment. Veal and Klepser[10] reported good results in surgical cases, using a greaseless glycerin base with 2 per cent allantoin. There are also numerous preparations on the market, most of them containing 5 to 10 per cent of the drug in petrolatum.

DISCUSSION OF THEORETICAL ASPECTS

A sufficient concentration of the drug at the site of the infection is necessary to obtain the maximal effect, and a high local concentration and a low blood level are desirable.

The following questions had to be considered. (1) Choice of the drug. (2) Concentration of the drug to be used. (3) A suitable vehicle.

1. Two main factors determine the choice of the drug. Firstly, the organisms causing the infection and secondly, the solubility of the drug in serum at body temperature. In most cases of skin infections the bacteriological findings are hæmolytic streptococci or staphylococci or a mixture of both. It seems evident that sulfathiazole acts effectively against both these organisms. The question of solubility of these various compounds in different vehicles at different temperatures has been studied by several authors. The solubility in water at room temperature differs considerably from the figures found in serum at body temperature.[11] Hawking[12] gives the following figures:

1. Saline at body temperature:
   - Sulfanilamide ..... 1.5 per cent
   - Sulfapyridine ..... 0.042 " "
   - Sulfathiazole ..... 0.108 " "
2. Serum at body temperature
   - Sulfapyridine ..... 0.06 " "
   - Sulfathiazole ..... 0.18 " "
   - Sulfadiazine ..... 0.12 " "

To establish the validity of these figures for the animal body, the following experiments were performed by the same author. A long tubular wound was made underneath the skin of rats and 0.2 gram of each drug was inserted on one side; after 2 to 6 hours the concentration was measured at the distant side of the wound and the following values were obtained: sulfanilamide 50 mg. per cent; sulfapyridine 5 mg.

per cent; sulfathiazole 20 mg. per cent; sulfadiazine 10 mg. per cent.

Sulfanilamide and sulfathiazole are far more soluble than sulfapyridine and sulfadiazine and, therefore, more suitable for external use.

The sodium salts of most sulfonamides are very soluble; solutions of 30 per cent are easily obtainable. The drawback is the high alkalinity. A pH of 10 to 13 makes the use of these solutions unsafe in irritable skin conditions.

2. *Concentration.*—Very little has so far been reported about the concentration of these drugs in the skin after external use. It is well known from the internal treatment and from application in open wounds that a certain blood level or tissue concentration has to be achieved for a therapeutic effect. It seems logical to assume that the same applies to the skin and its capillary and lymphatic vessels. The ointments used by various authors contained from 2 to 10 per cent of the drug; considering the poor solubility of the sulfonamides, it is difficult to understand how a sufficient tissue level could be reached and maintained by concentrations lower than 5 per cent.

3. *Vehicle.*—The drug in powdered form is certainly effective, but its use is complicated and unsatisfactory in practice. The fact that the external use of sulfonamides in dermatology has hitherto found little popularity seems chiefly due to the lack of a suitable ointment base. The use of petrolatum and other greasy ointments is not indicated especially if much secretion is present. The desired action of the drug could easily be counteracted by the untoward effects of the base. In addition, the use of greasy bases and chiefly of petrolatum does not seem rational; it does not penetrate very well, nor does it mix with serum. By using a greasy base each particle of the drug is coated with a non-soluble substance and, therefore, resorption is prevented.

Locatelli and Bowden[13] have established that the activity of sulfanilamide varies with the type of vehicle used. He tested four preparations in addition to pure sulfanilamide. (1) Oily base—olive oil plus 30 per cent sulfanilamide; (2) liquid paraffin plus 30 per cent sulfanilamide; (3) ointment base—unguentum simplex plus 30 per cent sulfanilamide; (4) water-soluble base—glycerin plus 30 per cent sulfanilamide; (5) pure sulfanilamide powder.

Five mils of a 24 broth culture from several infected wound swabbings was inoculated into 100 mils of melted nutrient agar at 45° C., and mixed. The mixture was then poured into five petri dishes and allowed to set. A ¼ inch square of agar was lifted out of the centre of each dish and the resulting cavities were filled with one of the above mentioned preparations. The whole was incubated for 24 hours at 37° C., then the area of bacteriostasis was measured, with the following results:

1. Liquid paraffin	3.9 cm.
2. Olive oil base	4.0 cm.
3. Unguentum simplex	no stasis
4. Glycerin	4.5 cm.
5. Pure powder	4.0 cm.

The action of the sulfanilamide was thus greatest when dispersed in glycerin and least, with no action at all, in the ointment base. The fact that glycerin is miscible with water and serum, and clinical reports, substantiate these findings. The higher solubility of the sulfonamides in glycerin explains its superiority as a vehicle.

Preliminary experiments seem to indicate that the solubility of sulfathiazole in glycerin at room temperature is about ten times higher than that in water under the same condition. Exact figures will be published later.

A suspension of sulfanilamide and sulfathiazole in glycerin was not satisfactory; the powder settled and an uneven distribution resulted. The suspension was sticky and did not dry when applied to the skin. Considering the theoretical aspects, the clinical and experimental reports, an attempt was made to obtain a 10 to 50 per cent sulfathiazole and sulfanilamide cream in a glycerin base.

The preparations used in the following experiments contained 30 per cent sulfanilamide and sulfathiazole, respectively, suspended by emulsifying agents in glycerin.* The resulting cream was miscible with water and serum and, therefore, easily removed with water. It is a white, soft, creamy paste with a pH between 6 and 7 which forms an elastic, half-dry, adherent coating when applied to the skin.

Blood level after external application of sulfonamides.—Goodwin and Findlay,[14] Jensen and co-workers,[15] Legroux,[16] McIntosh,[17] Herrell and Brown,[18] Hawking[19] and others studied the rate of absorption of sulfonamides from open wounds in animal experiments and on clinical cases. The absorption was found to be highest with

* Courtesy F. W. Horner, manufacturing chemists, Montreal, Que.

sulfanilamide and lowest with sulfapyridine. The excretion was most rapid with sulfanilamide and slowest with sulfapyridine. Sulfathiazole had an intermediate position. We were unable to find any reports about the rate of absorption of these compounds through the skin. Schnieper,[6] Sams and Capeland[7] and others state that no untoward systemic symptoms were observed after the application of sulfonamide ointments. Sams and Capeland reported one case in which no sulfathiazole was found in the blood after two days, applications of a 10 per cent sulfathiazole suspension in cod liver oil.

EXPERIMENTS

Fifty per cent sulfanilamide and sulfathiazole paste respectively were applied twice daily to the whole body of six patients with generalized dermatitis and to four controls with normal skin.

TABLE I.

VENOUS BLOOD LEVEL IN MG. PER CENT WHEN THE WHOLE BODY WAS COVERED WITH SULFANILAMIDE AND SULFATHIAZOLE PASTE RESPECTIVELY.

	Normal skin			*Generalized dermatitis*		
	Case	*24 hours*	*5 days*	*Case*	*24 hours*	*5 days*
50% sulfanilamide paste	1	0.25	0.85	1	0.8	6.2
	2	0.41	1.51	2	0.68	4.5
	..	....	....	3	0.65	3.05
50% sulfathiazole paste	1	0.1	0.32	1	0.3	2.2
	2	0.08	0.18	2	0.3	2.8
	..	....	....	3	2.0	4.0*

*New born infant.

Thirty per cent sulfathiazole in petrolatum gave similar figures on unbroken skin and much lower ones on broken skin. A further control was made with a 25 per cent suspension of sulfathiazole in a base containing cholesterol, cod liver oil and lanoline;* the absorption through unbroken skin was higher, through broken skin similar to that with glycerin paste.

DISCUSSION

Both sulfanilamide and sulfathiazole externally applied are absorbed into the blood stream, the absorption rate being highest with sulfanilamide on broken skin. There is considerable increase of absorption if the skin is deprived of stratum corneum. No dangerous blood concentration was observed when sulfathiazole was used.

In addition to the determination of the venous blood levels, the capillary blood on the site of application of the paste was examined. The skin was thoroughly cleansed, soaked in water and dried without using either alcohol or ether. By needle pricking or a small cut, 0.1 c.c. of blood was taken without much squeezing.

TABLE II.

VENOUS BLOOD LEVELS OF 6 CASES TREATED SULFATHIAZOLE PASTE 30 PER CENT BEING APPLIED TO LESIONS ONLY

Case	*Age of patient*	*Site of application*	*Blood level examined after*	*Affection*	*Venous blood level in mg. per cent*
1	2 years	Head, scalp and neck.	5 days	Infantile eczema secondarily impetiginized.	0.65
2	7 years	Scalp.	2 days	Infantile eczema secondarily impetiginized.	0.8
3	6 years	Both feet and hands.	3 days	Epidermophytosis secondarily infected.	0.35
4	11 years	Arms, hands, legs and feet.	3 days 8 days 12 days	Epidermophytosis.	0.2 0.47 1.05
5	4 mos.	Face.	4 days 8 days	Dermatitis secondarily infected.	0.35 0.8
6	62 years	legs, thighs arms, groins and axillæ.	3 days 8 days 13 days	Dermatitis chronic.	0.35 0.4 0.4

When this method was used, capillary blood was obtained which was highly arterialized; this blood is probably mixed with traces of tissue and lymph fluid. This method was used in 28 instances and the local capillary level was in all cases 5 to 10 times higher than the venous blood level. The most plausible explanation is that the drug is absorbed by the skin and that a high concentration is maintained in the tissue fluids. Further experiments are in progress with regard to the local concentration in the skin.

Clinical experiments.—After evaluating the effect of sulfanilamide and sulfathiazole paste in a series of 15 cases we discontinued the use of sulfanilamide paste for clinical purposes for three reasons: (1) sulfathiazole was superior in effect; (2) sulfanilamide crystals were very hard and the resulting paste was gritty and apt to be irritating; (3) the higher venous blood levels produced by sulfanilamide in infants were considered unfavourable. A 30 per cent sulfa-

* Courtesy of Ayerst, McKenna & Harrison, Montreal, Que.

thiazole glycerin paste was used in the subsequent cases reported in Table III and case histories.

CASE 1

A six year old Polish boy, ill for 3 days. On admission he presented a superficial pustular eruption with some crusting involving the buttocks. The inguinal glands were enlarged, firm and very tender. Fairly severe constitutional symptoms were present, with vomiting and a temperature of 104°, which later dropped to 101°. White blood count was 13,700 with 73 per cent polymorphonuclears. Diagnosis: — Staphylococcal pyodermia. Rapid clearing after application of the paste with complete cure including the lymph adenopathy after one week.

CASE 2

A French-Canadian girl aged 9 with an eruption for five weeks. Skin between shoulder blades and on breasts was yellowish-red, greasy and squamous. Numerous pustules and crusty lesions were present. Diagnosis:— Seborrhœic dermatitis with superimposed infection. Bacteriological report:—*Staphy. pyogenes* and *S. hæmolyticus.* Application of 5 per cent sulphur ointment did not improve the condition, but after two days' treatment with 30 per cent sulfathiazole paste the infection was cured. The skin was clean, the reddish colour and the greasy appearance had disappeared. She was discharged after three days of treatment.

CASE 3

G.B., a four year old English child whose face was covered with honey-coloured crusts. Diagnosis:—Impetigo contagiosa. Bacteriological report: — *S. hæmolyticus.* After two days' treatment, lesions were dry and clean with residual redness. After four days' treatment the patient was completely cured.

CASE 4

H.L., a French-Canadian girl, 11 years of age, had "athletes' foot" for many years. Bean-sized pustules were present between toes and fingers and on both soles and palms, which were inflamed and very painful. Bacteriological findings showed the presence of *Staph. pyogenes aureus.* After two days' treatment the skin was dry, but still slightly red and squamous. Discharged as cured after 7 days of treatment. Ten days later relapse occurred with same symptoms as before which again disappeared after seven days of treatment. The patient was told to continue using the paste at home, but in spite of this, relapse again occurred after 2 weeks,

TABLE III.

Number of cases	*Diagnosis*	*Cured within*			*Improved*	*Not improved*	*Remarks*
		2 days	*7 days*	*14 days*			
37	Impetigo	7	27	3	..	..	
6	Ecthyma	..	4	2	..	..	
6	Superficial pyoderma	2	3	1	..	..	
18	Secondarily infected dermatitis	6	10	1	1	..	No irritation observed. Cure refers to secondary infection, not to underlying dermatitis.
5	Infectious eczematoid dermatitis	..	..	1	2	2	Two cases reacted with flare-up.
5	Seborrhœic dermatitis, secondarily infected	1	2	1	..	1	Cure refers to secondary infection, not to underlying dermatitis.
6	Pustular interdigital dermatitis	3	2	..	..	1*	Relapse in 1 case after 10 days.
12	Secondarily infected pustular ringworm	4	4	2	..	2*	Cure refers to secondary infection only. Two cases relapsed (see case reports).
10	Acne vulgaris, pustular form	2	3	3	2	..	Cure refers to pustular stage.
9	Sycosis barbæ	..	2	1	1	5	One case reacted with swelling of face to sulfathiazole internally and displayed some reaction to external application. Patch test negative.
2	Lupus erythematosus	..	..	..	..	2	
1	Chronic abscess of face	..	..	..	..	1	
1	Chronic G.C. bartholinitis	..	..	1	..	..	
10	Prophylactic use	..	..	..	..	..	See discussion.

*Relapse considered as not improved.

but the vesicles were filled with clear fluid. Bacteriological report was negative.

CASE 5

E.M., a 45 year old Scotsman had acne with many comedones since puberty. Acute pustular eruptions occurred on different occasions lasting for at least eight weeks. Sulfathiazole paste was used during one of these eruptions and the face cleared in four days. The underlying comedones were not influenced.

CASE 6

A 24 year old English girl had acne for eight years. The skin was not very oily and only a few comedones were present. There were numerous superficial pustules. After five days' treatment with sulfathiazole paste the face was clear. Occasional pustules reappeared after five weeks.

CASE 7

B.L., a 28 year old American woman, underweight and anæmic, with chronic bronchitis and bilateral bronchiectasis, had a subacute fistulating abscess on left cheek, 1 to 3 cm. in diameter for eight months. Bacteriological examination showed the presence of *Staph. pyogenes*. Histology — unspecific inflammation. No laboratory evidence of tuberculosis or lues was found. Local therapy including x-ray had been unsuccessful. Sulfathiazole paste was applied locally and injected into the abscess. It did not improve or arrest the condition.

CASE 8

A new-born female child displayed bullæ on hands and breast at birth. *Staph. pyogenes* were found in the blister fluid. The family history was of interest. The mother and two members of the family developed an eruption on exposure to the sun. A brother, the first child, died at the age of three months from pneumonia following prolonged illness, due to impetigo(?) The blood Wassermann test of mother and child was negative. There was no history of lues.

A tentative diagnosis of Ritter's disease was made and sulfathiazole, gr. x, t.i.d. was prescribed, cyanosis developed after 24 hours and the drug was discontinued. After two days, sulfathiazole was applied locally. New bullæ developed during the next four weeks. Whole blood and plasma were given intravenously and the general condition remained good. The blood level during this period was as high as 4 to 6 mg. per cent without any systemic symptoms. No cyanosis was observed and repeated hæmograms were normal. Several blood cultures were negative. After four weeks the treatment was discontinued and death occurred 5 days later. The autopsy revealed a bronchopneumonia. Pure culture of *Staph. pyogenes* was found in the heart blood and in the lungs.

This case seems to be interesting for several reasons: (1) the blood level was found to be much higher than in older children or adults; (2) sulfathiazole orally was not tolerated, while the percutaneous application was tolerated well; (3) it is not conclusive, but suggestive that general septicæmia was prevented as long as a high sulfathiazole blood level was maintained; (4) no curative result was obtained.

DISCUSSION

1. In impetigo and ecthyma the effect compared most favourably with all other methods used. In all cases quick cure was accomplished without relapse or irritation.

Pratt, Imhoff and Decker reported an average of 26 days for curing of impetigo when using ung. hydrarg. ammon., and an average of sixteen days when using colloidal kaolin lotion with mercury. Sulzberger states that this condition could be cured in from 5 to 26 days.

The average time in our cases was less than seven days; a weekly interval was chosen for control, as many patients were unable to visit the clinic earlier. Many patients reported that cure was obtained after three or four treatments; these statements were disregarded in our charts and the day of examination was considered as date of cure.

2. Secondarily infected dermatitis. The secondary infection and impetigo disappeared readily. As sulfathiazole seems to be non-irritating, the effect of the paste on the dermatitis is comparable to the effect of any glycerin-powder lotion.

3. Secondarily infected epidermophytosis. Though the effect was dramatic in most instances, pseudo-cure only was obtained (see case 4). Sulfathiazole has no fungicidal properties and antimycotic treatment has to be used. The rapid cure of the infectious element permits earlier and more effective treatment of the underlying epidermophytosis.

4. Acne vulgaris. In pustular forms sulfathiazole has proved satisfactory. The pustules disappear readily and the skin loses its greasy appearance, but the comedones are not influenced (see cases 5 and 6).

5. Sycosis. Only two out of nine patients were cured; these two were acute cases. The other seven cases had all suffered for more than three months from this condition. It seems that deeper forms and chronic cases do not react to external applications of sulfathiazole. Dr. L. P. Ereaux was good enough to observe several cases and corroborates these impressions.

6. Infectious eczematoid dermatitis. The results in this condition were doubtful. While cure was obtained in two instances, in three cases the reactions were unfavourable. New nummular patches appeared and the condition seemed rather irritated.

7. Only one case of a deep-seated staphylogeneous abscess was observed. Considering the reports that pus, breakdown products of protein and peptone inhibit the effect of the sulfonamides[20] and that para-amino-benzoic acid has been found in chronic abscesses, no effect was expected.

No specific instructions were given to the patients, except that the crusts had to be removed before starting therapy. Cleansing with soap

and water was recommended in impetigo and allied infections and oil compresses in dermatitis. The ointment was applied once or twice daily. The general impression was that either a very rapid cure was obtained or no effect at all was observed.

PROPHYLAXIS

The paste has been used as a prophylactic, both in accidental wounds and in operations (sebaceous cysts). The wound was closed after application of the paste and healing was rapid and uneventful. The number of cases was too small to draw any definite conclusions. As the amount of sulfathiazole is as high per volume with the closely packed paste as with pure powder a good prophylactic effect may be expected. The easy application and dosage of such a paste seems to be of great value in prophylaxis of accidental wounds and its use should be of great value in war surgery.

Side effects.— (*a*) *General symptoms.*—No systemic effects of any kind have been observed. Considering the low blood levels no such reactions should be feared. In infants with extensive skin lesions higher levels may occur (see case 8). (*b*) *Local sensitivity.*—In this series of cases no specific sensitization of contact type was observed. The condition became worse in two cases of infectious eczematoid dermatitis and in one case of sycosis. Patch tests were negative. Dr. L. P. Ereaux saw two cases of flare-up in seborrhœic dermatitis and ringworm. Sams and Capeland[7] reported one case of contact sensitization. Probably in a greater series more cases of sensitivity would be observed. No tendency to retard healing has been observed; rather the reverse seems to be true.[4, 7]

SUMMARY

The literature of external applications of sulfonamides in skin conditions has been critically reviewed. The theoretical aspects of solubility, concentration and vehicle of different preparations has been discussed. A 30 per cent sulfathiazole glycerin paste has been described and its absorption studied. A total of 130 patients have been treated with this paste and out of 107 superficial skin infections, 99 cases were cured within two weeks. The average healing time was seven days. These results are very satisfactory and encourage further studies on the external use of sulfathiazole for skin diseases.

NOTE.—Since this paper was completed several articles on the external use of sulfathiazole in different ointment bases have been published.[21, 22, 23, 24]

Because of the scarcity of sulfathiazole and glycerin, due to war conditions, the effect of lower concentrations (5, 10 and 20 per cent sulfathiazole) in the following vehicles was observed: (1) Petrolatum. (2) Ung. aquæ rosæ. (3) Aquaphor (petrolatum with oxycholesterol). (4) Zinc paste (20 per cent of each, zinc oxide and talc. pulv., and 30 per cent of each, petrolatum and lanolin). (5) The above paste with oil of cade 5 per cent. In either concentration sulfathiazole produced beneficial effects in any of these vehicles. Pure petrolatum seemed to be the poorest base, but was improved by the addition of oxycholesterol. The effect was not reduced perceptibly by zinc paste, with or without oil of cade. No difference was noted between sulfathiazole concentrations of 5 to 15 per cent, but at concentrations of 20 per cent and above the effect was increased. With all these vehicles the healing time for impetigo contagiosa was about twice as long as with the previously used glycerin paste. It was, however, considerably shorter than with ung. hydrarg. ammon. and gentian violet.

In summarizing these clinical impressions it may be said that high concentrations of sulfathiazole in a glycerin gave the best results. Several hundred additional cases have been observed and cure was obtained in five days in most instances, if not, therapy was discontinued.

Several cases of sensitivity to internal as well as external application of the sulfonamides have recently been observed. One case being of particular interest because patch tests with pure sulfathiazole powder and 5 per cent sulfathiazole in glycerin paste gave a positive result while 10 per cent sulfathiazole in petrolatum gave a negative result. The control with the glycerin base was negative. Patch tests with sulfathiazole in a liquid paraffin-triethanolamine base as described by Ackman and Wilson[23] were inconclusive, because the base alone gave a positive reaction, possibly due to the alkalinity of the triethanolamine.

Pillsbury[25] has published elaborate and exact experiments on this subject. He found greasy bases unsuitable and used as a vehicle, an emulsion of glycerin and oil in water.

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RÉSUMÉ

Les applications locales de sulfamidés ont été réalisées avec succès dans le traitement des dermatoses infectieuses. Le sulfathiazole s'est avéré le médicament de choix à tous points de vue; la concentration de 30 pour cent est la meilleure et la plus active, enfin, le véhicule le plus pratique est une crême faite d'agents facilement émusionnables dans de la glycérine. Cette préparation empêche l'absorption massive du médicament, ne cristallise pas et demeure élastique. Elle peut s'employer prophylactiquement. Les résultats ont été excellents dans l'impétigo, les dermatoses infectées secondairement, l'acné pustuleuse, pour ne nommer que les dermatoses infectieuses les plus fréquentes. Le temps de cure est singulièrement écourté. Ces résultats encourageants doivent faire continuer les recherches en ce sens.

JEAN SAUCIER

WEIGHTS AND MEASURES IN MEDICINE*

BY R. L. STEHLE

Montreal

WEIGHTS and measures, and the Latin language, so far as they concern the physician in English-speaking countries, are really not serious subjects. The proper person to write about them would be Stephen Leacock.

In the English-speaking world, among physicians, there still exists a lame Latin tradition. The soundest argument in favour of the use of Latin in the prescribing and dispensing of drugs is that it is a universal language and, therefore, valid in any country regardless of the vernacular. If the argument is good in the case of prescribing and dispensing drugs it is also good in much more important cases. It would be convenient to have one language for use in writing on any matter of international interest. The fact is, however, that anyone interested in the activities of foreign nations must learn more and more languages. So far as medicine is concerned Latin is now nearly dead. Most medical schools do not require any knowledge of Latin for admission. Neither the British Pharmacopœia nor the United States Pharmacopœia has ever been issued in Latin.

The imperial and apothecaries' systems of weights and measures have more vitality in the English-speaking world than has Latin. Not a good word can be said in behalf of either, and yet, year after year, when medical students reach the clinical subjects they abandon the most satisfactory system of weights and measures ever devised and adopt either the imperial or apothecaries' system. This is a truly remarkable phenomenon. They do even more than this. They adopt Roman numerals in preference to Arabic and signs in preference to words. What is the explanation? Can it be that the physician, noting the admiration which his prescription arouses in his patient, concludes that he must be pretty good to be able to concoct such a conglomeration of Latin abbreviations, symbols and Roman numerals? Perhaps a physician should do a card trick after he has handed his prescription to his patient! The proponents of the view that medicine is an art rather than a science certainly have an argument in prescription writing.

While the universality of Latin is used as an argument for its retention this argument cannot be used for the retention of the imperial and apothecaries' systems. Outside the English-speaking world they are not employed and books and journals published in English which employ the imperial and apothecaries' systems only are unknowingly exhibiting their provinciality. If writers insist upon using these units they should at least give the metric equivalents for the benefit of foreign readers. (This applies not only to drug dosages but to all measurements of length and weight as well.) It is odd that the imperial and apothecaries' systems are entrenched chiefly in the case of doses and prescription writing. Metric units only are used throughout the British and U.S. Pharmacopœias for all weights or measures except doses (in which case both metric and imperial units are used).

In Great Britain, prior to 1864, as in the United States today, the apothecaries' system existed only for pharmaceutical operations. The imperial system of weights was used for all commercial purposes. The tables of these two systems will facilitate understanding what follows.

* From the Department of Pharmacology, McGill University.

Apothecaries' weights		Imperial weights	
1 pound	12 ounces	1 pound	16 ounces
1 ounce	8 drachms	1 ounce	437.5 grains
1 drachm	3 scruples		
1 scruple	20 grains		

Apothecaries' measures		Imperial measures (devised in 1824)	
1 gallon*	8 pints	1 gallon†	8 pints
1 pint	16 ounces	1 pint	20 ounces
1 ounce	480 minims	1 ounce	480 minims

* This is the wine gallon which is the only gallon in use today in the United States.

† This is the Imperial gallon adopted in 1824 and now the only gallon in Great Britain.

Up until 1864 separate pharmacopœias were in use in London, Edinburgh and Dublin. In that year the first British pharmacopœia was issued and superseded the three mentioned. Each had gone its own way as far as weights and measures were concerned and there was pure confusion.

Prior to 1836 the London Pharmacopœia used apothecaries' weights and measures. In the revision of 1836 it continued to use apothecaries' weights but adopted the imperial system of measures which came into use in 1824 when the new gallon (the present one) replaced the wine gallon (the present gallon of the U.S.A.). There was some sense to devising a new gallon. For the first time a relation was established between solid and liquid measures, the gallon being the volume occupied by 10 pounds (avoirdupois) of water and the fluid ounce, therefore, the volume occupied by one ounce of water. It is interesting that when it came to sub-dividing the new fluid ounce there seems to have been no hesitation in dividing it into 480 minims and retaining the term fluid drachm to designate ⅛ of a fluid ounce or 60 minims. The imperial minim has, obviously, no simple relation to the grain. It is 1/480 of an imperial fluid ounce, whereas the grain is 1/437.5 of a solid imperial ounce. Neither does the imperial minim have any simple relation to the apothecaries' minim. The latter being 1/480 of an apothecaries' fluid ounce.

In the edition of 1851 the same policy was continued. The Edinburgh pharmacopœia of 1839 also employed apothecaries' weights and imperial measures.

The Dublin pharmacopœia of 1850 was in advance to the other two. It discarded apothecaries' weights and employed imperial weights *and* measures. It went even further. The Dubliners did not like the idea of seeing the solid drachm and scruple go into the discard so they invented new ones, the drachm being ⅛ of the imperial ounce (54.68 grains) the scruple 1/3 of the drachm (18.22 grains). To be sure these drachms and scruples were not comprised of nice even numbers of grains as they had been in the apothecaries' system of weights but at least, they were drachms and scruples. It is doubtful whether they were ever actually used; they were too cumbersome.

When the pharmacopœias of London, Edinburgh and Dublin were superseded by the British Pharmacopœia of 1864 both imperial weights and imperial measures were adopted. The Dublin idea of dividing the ounce into drachms and scruples was abandoned. Consideration was given to making a new grain by dividing the imperial ounce into 480 parts so as to be able to retain the drachm and scruple, but the idea did not carry.

If the makers of the first British Pharmacopœia thought that the drachm and scruple would disappear from use they were mistaken. They are still used, and the British Pharmacopœia of 1932 recognized that these terms have not died. It states that the symbol ℥ i is used to represent 60 grains and the symbol ℈ i to represent sometimes 480 grains and sometimes 437.5. Confusion concerns the ounce, therefore, rather than the drachm. The writers of the British Pharmacopœia appear now to be of the opinion that if they can discourage the use of symbols the problem will be solved, *i.e.*, that the solid drachm and scruple will disappear. They recommend, therefore, that the use of the symbols be discontinued and the words or their abbreviations (as well as Arabic numerals) be used instead. The recommendation applies not only to the use of the symbols in connection with the solid ounce and drachm but also to their use in connection with the fluid ounce and drachm where there is no confusion.

This is a hopeful recommendation and nothing more. Physicians seem to like these symbols too well to discard them. They may learn eventually that there is only one solid ounce and that it contains 437.5 grains, but it does not follow that they will cease to use the symbol for it. They may discard the symbol for the drachm when they learn that the pharmacopœia does not recognize this unit for solids; on the other hand, it may continue in use, for 60 grains is a convenient intermediate between the grain and the ounce. Physicians certainly show no signs of discarding the sym-

bol in connection with fluid measures. Consultation of the most recent British books on therapeutics will reveal profuse illustrations of the use of symbols to represent both the solid and fluid ounce and the solid and fluid drachm. Such weights are still offered for sale in Great Britain.

The lasting influence of the apothecaries' system is apparent in tables of dosage. How else can the frequent occurrence of doses of 240 grains, 120 grains, 60 grains, and 30 grains be explained? These are all doses which formerly would have been expressed in drachms and scruples and they were doubtless selected because they were simple fraction of the apothecaries' ounce. Would the dose of magnesium sulphate be 30 to 240 grains if there had never been an apothecaries' system?

In addition to getting all tangled up with the old apothecaries' system, the imperial and apothecaries' systems are now getting tangled up with the metric system. Ridiculous though it is, ampoules are now being dispensed in which the volume of the dose is expressed in metric units and the drug itself in grains—for example, Ephedrinæ Sulphas, ¾ grain in 1 c.c.

An argument put forward against changing to the metric system is that it would be risky. Pharmacists do not have metric weights and measures and it is implied that if they continued to use their imperial weights and measures in filling metric prescriptions their arithmetic might be bad and lead to mistakes. Those who proffer this argument might be surprised to know that even now the preparations they prescribe probably do not contain in some cases just what they suppose. If the symbol ℥ may mean 437.5 grains or 480 grains which do they want in their prescriptions, and which do they get? How often does the pharmacist inquire? The truth is it doesn't matter much which quantity is employed and if that is satisfactory there is nothing more to be said. The application of the same degree of carelessness by a grocer is much more serious.

If the physician thinks that all pharmacists understand the imperial system he is mistaken. The writer knows of an instance in which two groups of pharmacists (not two individuals) disagreed regarding the number of grains of substance necessary to make a certain quantity of solution of stated strength. Of course there was only one answer, but nevertheless a case could be made for even the wrong answer. The disagreement could not have occurred in the case of the metric system.

It is useless, perhaps, to point out that the use of the metric system would be a complete remedy for the present state of confusion. Any physician will admit this unhesitatingly, but will not do anything important about it. The writer was recently told by a professor of medicine that for physicians the dose of morphine is ¼ grain and that it would never be 15 milligrams. Personally he was in favour of the metric system but he knew physicians.

In the United States the symbols of the apothecaries' system may be enjoyed legally and consistently. There the old apothecaries' system in all its glory and with all its difficulties still exists without competition. Fundamentally, it is a little worse, but not much worse, than the imperial system, for the solid and liquid units have no simple connection; the solid ounce is one thing, the liquid ounce is another.

This little paper started off facetiously. It may as well end that way. To solve all the difficulties of weights and measures in the English-speaking world why not appoint a committee to devise symbols for use with the metric system? There could be one for the milligram, one for the gram and one for the millilitre, say the symbol 3 with a vertical stroke through it for the first, the symbol ℥ with a stroke for the second and the same with an *f* through it for the third. If this were done then physicians who balk at giving up their symbols would be satisfied; they could even continue to use Roman numerals. Then one could write truly "these differences are happily removed".*

* Remark on page 39 of W. Lewis' "New Dispensatory", London, 1799, in a discussion of the system of weights used in medicine.

OBSTRUCTIVE JAUNDICE*

BY O. W. NIEMEIER

Hamilton, Ont.

THE group of conditions which cause jaundice by obstruction of the extra-hepatic biliary passages are of particular interest to the surgeon as they are essentially mechanical in nature and require surgical treatment for their relief. However, because of the many problems and difficulties in diagnosis and treatment associated with these conditions they are also the concern and responsibility of the internist and general practitioner who usually first see these cases.

The observations which follow upon this subject are based upon the study of a series of 73 cases of obstructive jaundice occurring at the Hamilton General Hospital and at St. Joseph's Hospital, Hamilton, during the past five years, including a group of 13 cases personally seen by the writer. Only those cases have been included in this series in which the diagnosis was established either at operation or autopsy. A classification of these cases is given in Table I below.

TABLE I.

SEVENTY-THREE CASES OF OBSTRUCTIVE JAUNDICE

Condition	*Number of cases*
Carcinoma of gall bladder	10
" " head of pancreas 25	
" " ampulla of Vater 3	31
" " common bile duct 3	
Stricture of common bile duct	1
Stone in common bile duct	31
	73

While surgery obviously offers the only possible treatment for these cases of obstructive jaundice the mortality in those cases which were subjected to operation is sufficiently high to warrant serious consideration. This is given in the following Table and includes our series as well as several others.

These figures speak for themselves and indicate the need for improvement in the present method of handling these cases. The figures in our series in the carcinoma group have been reduced during the past two years largely as the result of the use of vitamin K. In the stone group associated with deep jaundice the average mortality is 16 per cent. When we compare this with a series including also the non-jaundiced cases as reported by Allen, we appreciate how adversely jaundice and associated liver damage affects the prognosis in these cases. Furthermore, the mortality in these cases which had had a previous cholecystectomy rose to 36 per cent in Heyd's series. As we shall point out later 25 per cent of our common duct stone cases had had a previous operation upon the biliary tract. This illustrates the importance of a thorough and careful primary operation to avoid the high mortality associated with these secondary procedures.

TABLE II.

OPERATIVE MORTALITY IN OBSTRUCTIVE JAUNDICE

	Carcinoma of head of pancreas	*Stone in common duct*
	percentage	*percentage*
Our series—5 years	40	
1936-1938	50	16
1939-1941 (inc.)	30	
Finsterer		22
Heyd	30	14
		(after previous operation)
Heyd		36
Grey Turner		13
Fraser, Sir John	40-50	
Allen		7 including non-jaundiced cases

An analysis of the case histories in this series revealed the fact that in the group treated surgically, considerable delay occurred between the onset of the jaundice and the time of operation. This interval varied from five days to five months—the average being six weeks.

Furthermore, in those cases of obstructive jaundice due to stone in the common duct, it was found that many had had biliary pain, flatulent dyspepsia, and sometimes recurrent attacks of jaundice for years. The duration of these symptoms referable to the biliary tract varied from six months to twenty-eight years, many cases having had symptoms for eight to ten years. In 25 per cent of this group with jaundice due to common duct stone, there had been a previous operation upon the gall bladder without exploration of the common duct. As

* Read at the Seventy-second Annual Meeting of the Canadian Medical Association, Winnipeg, June 26, 1941.

Lahey has shown that in 20 per cent of gall bladder cases stones are present in the common duct, it is possible that in some of these cases stones had been present since the first operation. In two cases where stones were present in the common bile duct a previous choledochotomy had been performed with removal of stones from the duct.

An analysis of the causes of death following operation is given in the Table below.

TABLE III.

CAUSES OF DEATH—POSTOPERATIVE

Causes of death	*Carcinoma of head of pancreas*	*Stone in common duct*
Hepatic failure	7	3
Hæmorrhage	3	0
Infection	0	3
1 Cholangitis		
1 Subphrenic abscess		
1 Septicæmia		
Pneumonia	1	1
Myocarditis	0	1
Pulmonary embolism	1	0

The significant thing here is the fact that 50 per cent of the deaths were due to hepatic failure. Surely this is evidence enough that operation had been postponed too long. The low incidence of deaths from hæmorrhage is probably attributable to the use of vitamin K.

The damaging effects of obstruction of the common bile duct upon the liver are well known and are in direct proportion to the degree and duration of the obstruction. The back-pressure causes dilatation of the entire ductal system including the small intra-hepatic ducts. This dilatation is most marked in obstruction due to carcinoma of the head of pancreas and includes the gall bladder in these cases. Owing to back-pressure, degeneration occurs in the liver cells and ruptures are also seen of the smaller bile capillaries.

In the case of stone in the common duct, infection is usually present and changes from this source are superadded. The ducts are thickened and inflammatory changes about the ducts and even purulent accumulations in the smaller ducts or small abscesses in the liver are present. In long-standing cases late changes resembling cirrhosis occur.

One instinctively asks, in the light of this knowledge, why delay in treating cases of obstructive jaundice so often occurs? One reason is the attitude of the profession toward these cases. The physician fears that he may subject a patient with non-obstructive jaundice of toxic or infective origin to an unnecessary operation. Furthermore, he knows that if the latter condition is present it usually eventually recovers spontaneously. The line of least resistance is "to wait and see" and if in five to six weeks the patient is not improving or is getting worse, it is assumed that the case is probably one of the obstructive type and the surgeon is called in. That this attitude actually prevails is shown by the results of a questionnaire sent out by Bloomfield to a representative group of internists and surgeons asking "How long should operation be deferred in cases of intense jaundice of recent onset?" The replies of the internists advised waiting four to five weeks. Those of the surgeons advised operation in one week. It would seem necessary to change the attitude of the physician toward these cases if surgical results are to be improved.

There is, of course, another reason for delay in these cases and that is the difficulty of diagnosis. However, with the adoption of the clinical and laboratory methods at our disposal, it should be possible in 90 per cent of these cases to make a diagnosis in at least ten to fourteen days. Our first problem is to exclude the non-obstructive causes of jaundice as classified below:

NON-OBSTRUCTIVE JAUNDICE

1. Hæmolytic.
2. Hepatogenous: toxic, infective.

The hæmolytic group are readily differentiated by the findings in the Table below:

TABLE IV.

HÆMOLYTIC JAUNDICE

History	Previous attack. Familial.
Spleen	Palpable.
Stools	Bile ++.
Urine	Urobilin ++. Bile absent.
Van den Bergh	Indirect.
Blood	Fragility of red blood cell increased. Anæmia with spherical microcytes.

Toxic or hepatogenous jaundice may be recognized by the findings enumerated in the following Table:

TABLE V.

HEPATOGENOUS JAUNDICE

History	Drug, epidemic.
Onset	Gradual.
Spleen	Palpable +.
Liver	Palpable.
Stools	Bile +.
Urine	Bile +. Urobilin +.
Galactose tolerance test	More than 3 gms. excreted in 4 hrs.
Van den Bergh	Direct.
Hippuric acid test	Low.

As liver damage occurs early and is marked in these cases, liver function tests show a diminished power to store sugar and synthesize hippuric acid. The absence of obstruction permits bile to enter the intestinal tract and appear in the stool and urobilin in the urine in moderate amounts.

Obstructive jaundice on the other hand, in its early stages does not produce marked liver damage and liver function tests, for a time, remain comparatively normal. A high blood phosphatase is usually present and bile may be absent or scant in the stools. Urobilin is also absent or present in small amounts in the urine. These findings are summarized in the following Table:

TABLE VI.

OBSTRUCTIVE JAUNDICE

Van den Bergh	Direct.
Liver function tests:	
Galactose tolerance	Normal in early stages.
Hippuric acid	
Stools	Bile absent or scant.
Urine	Urobilin absent or scant.
	Bile ++.
High blood phosphatase.	

The differentiation of the obstructive group is greatly facilitated by having in mind a clear picture of the clinical syndrome present in the various conditions causing obstructive jaundice. To determine the accuracy of our present conception in this regard, an analysis was made of the cases in this group in which the diagnosis was proved.

The important symptoms, physical and laboratory findings are given in the following Tables:

TABLE VII.

CARCINOMA OF GALL BLADDER

Past history	Biliary colic, flatulence 60 per cent.
Onset	Insidious.
Pain	Slight, later moderate.
Jaundice	Slight, later moderate.
Palpable mass	In 90 per cent.
Stools	Bile ++.
Urine	Urobilin +.
Icterus index	Average 51, highest 100, lowest 15.
Stones in gall bladder	In 70 per cent.

The palpable gall bladder, insidious onset, absence of pain in the early stages, and absence of bile in the stools with normal liver function characterize carcinoma of the head of the pancreas.

Carcinoma of the gall bladder early presents a palpable mass without much jaundice at first and with bile in the stools. The onset is insidious.

TABLE VIII.

CARCINOMA OF HEAD OF PANCREAS

Past history	Negative.
Onset	Gradual, painless.
Pain	Late 80 per cent, dull in epigastrium and back.
Palpable mass (gall bladder)	Present 56 per cent.
Stools	Bile absent 80 per cent.
Urine	Urobilin absent.
Jaundice	Marked, progressive.
Galactose tolerance	Normal in early stages.
Hippuric acid test	Normal in early stages.
Icterus index	High, progressive.

TABLE IX.

STONE IN COMMON DUCT

Past history	Biliary colic and flatulence 60 per cent.
Onset	Sudden with pain in 90 per cent.
Palpable mass	Absent.
Stools	Bile + or − (variable).
Urine	Urobilin + or −.
Jaundice	Moderate, variable, may disappear.
Galactose test	Normal.
Hippuric acid	Normal.
Blood phosphatase.	High.
Icterus index	Variable—sudden rise with gradual fall.

Jaundice due to stone in the common duct is usually preceded by an attack of pain, commences suddenly, and is variable in degree. The gall bladder is not palpable and the bile is usually present in the stools as the obstruction is incomplete and variable.

The icterus index should be taken every two to three days and if plotted as a curve over a ten to fourteen days' period, will usually indicate the diagnosis. The cases of carcinoma of the head of the pancreas will show a high reading with a progressive rise as shown in Chart 1. The stone in the common duct will show an abrupt rise to a moderate or even high level with a gradual fall—see Chart 2. This latter condition constitutes the only valid reason for delay in these cases. If the curve is falling and the patient obviously improving, it is better to allow the jaundice to clear up before operating. If it remains stationary or after a fall begins to rise again prompt operation is indicated.

Careful pre-operative preparation in these cases of obstructive jaundice is essential. Fluids should be given freely together with generous quantities of glucose and sugar. If these cannot be administered in adequate amounts by mouth, they should be given intravenously. It is well known that saturation of the damaged liver with glucose protects it during operation.

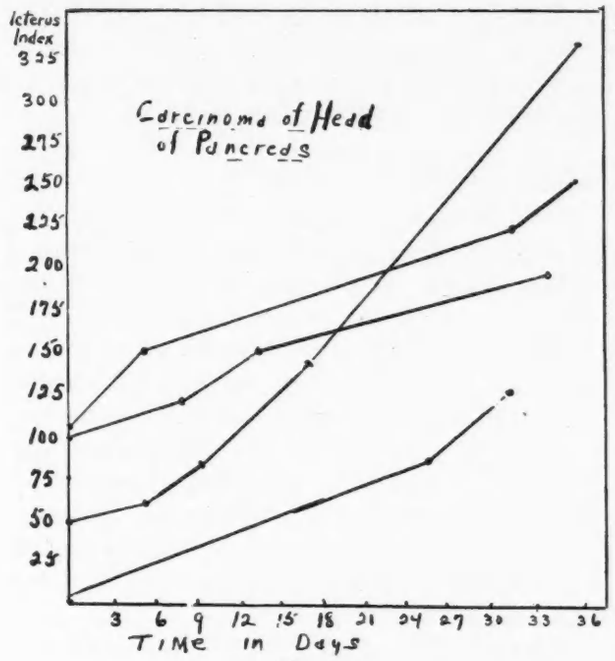

Chart 1

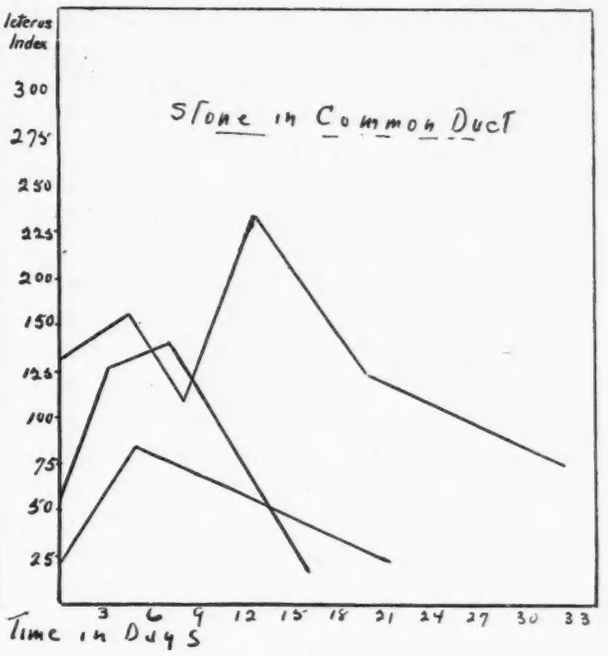

Chart 2

Charts 1 and 2.—Icterus index curves.

The danger of hæmorrhage in these cases has been greatly reduced by the administration of vitamin K and bile salts and this marks one of the greatest advances in the handling of these patients. As vitamin K is not absorbed from the intestinal tract in the absence of bile, it is necessary to add bile salts if oral administration is used. These patients are already saturated with retained bile salts, therefore the administration of the latter should be carried out with caution and only small amounts given, as they may damage renal and other tissues.

However, as many of these patients are nauseated or vomiting, the oral administration of sufficient amounts of vitamin K, even by duodenal tube as suggested by Walters is often difficult. The introduction of the synthetic form of vitamin K which can be given by parenteral injection therefore has come as a great boon. Furthermore, as it is unnecessary to give bile salts when this form of vitamin K is used, the danger mentioned above is avoided.

It is believed that vitamin K is essential for the formation of prothrombin which is always reduced in these patients. Prothrombin time estimations should be carried out, and operation not proceeded with until this is normal. The administration of vitamin K should be continued after operation as it has been shown that the trauma of operation and the toxic effects of the anæsthetic cause a post-operative fall in prothrombin with occurrence of bleeding. For this reason I still use blood transfusion during or after operation in certain cases as it not only aids in controlling post-operative hæmorrhage but minimizes post-operative shock.

It has been pointed out by several writers that prothrombin is probably formed in the liver, and where liver damage is severe, it may be impossible to bring prothrombin to a normal level by forcing administration of vitamin K. Reid has suggested that this may be used as a test for liver function. Even in the absence of jaundice, bleeding will occur post-operatively in certain gall bladder cases, as shown by Walters. Here there is probably a prothrombin deficiency due to unrecognized liver damage. In these cases where the response to vitamin K therapy is poor, blood transfusion immediately before operation and at intervals afterwards should be carried out. This failure to respond to vitamin K therapy in certain cases of marked liver damage is a further argument for earlier operation in these cases.

It seems obvious that surgery should be carried out at an earlier stage in chronic disease of the biliary tract as a prophylactic measure to prevent the necessity for operation upon these late, deeply jaundiced patients with common duct stone, in whom liver damage and infection constitute such hazards. This has been emphasized in a previous contribution by the writer and will not be further elaborated here. More frequent exploration of the com-

mon duct during gall bladder operations would also obviate the necessity of secondary operations for common duct stone. If infection is evident and stones are found, prolonged drainage of the common duct is indicated to clear up the infection and prevent recurrence of the stone. It is possible that the "perfusion" method of applying continuous irrigation with warm saline as described by McDonald may be helpful in clearing up this infection. If much débris is found in the duct, it should be a useful method of cleansing the latter and possibly preventing the recurrence of stones.

Certainly, the patient with obstructive jaundice should be given the benefit of early operation. If the diagnosis cannot be definitely established within two or at the most three weeks, I believe exploratory laparotomy should be carried out. We will find occasionally that an impacted stone in the ampulla will simulate a malignant lesion very closely.

In any case, even if an inoperable malignant condition is found, great relief from the jaundice and intolerable pruritus can be given these patients by a cholecyst-gastrostomy. In the deeply jaundiced patient, as all of the carcinoma cases are, this should be done in two stages—a cholecystostomy only being done at the first stage—and later, when the jaundice has cleared and the patient improved, the anastomosis of the gall bladder to the stomach is done as a second stage. Fraser has shown that the mortality in a large group was 40 per cent but that this could be reduced by using a two-stage operation in the deeply jaundiced cases to 20 per cent. This operation will give the patient from one to one and one-half years of comfort.

This two-stage method enables one to decompress the biliary tract more gradually if drainage is water tight and controlled by a "drainage against gravity" apparatus. Canonico has recently corroborated experimentally the previously known danger of sudden decompression in these cases and has shown that increased destruction of liver cells results.

Walters and Snell have shown that 15 per cent of their cases of carcinoma of the head of the pancreas in which cholecyst-gastrostomy was done lived over five years, showing that the lesion could not have been malignant as suspected. This indicates that even at laparotomy it is difficult to be sure of the diagnosis and presents another argument for giving these patients surgical relief even if only of a palliative nature.

More recently Whipple, Moreland and Freeman and others have reported successful removal of malignant lesions of the ampulla and the head of the pancreas by a two-stage operation with a number of survivals. As many of these lesions according to Ransom actually originate in the ampulla from which metastases are late and infrequent, it is claimed that many of these cases are resectable.

If any success is to be obtained by this method of radical cure, certainly these patients must be given the benefit of surgical treatment at as early a stage of the disease as possible and much earlier than is the practice at present.

In conclusion, may I state that the whole theme of this paper is a plea for earlier surgical treatment for the patient with obstructive jaundice. This includes prophylaxis by earlier treatment of gall bladder lesions and more frequent exploration of the common duct during gall bladder operations. When confronted with one of these severe cases of obstructive jaundice, by the prompt application of the diagnostic methods available, we should be able to make a diagnosis in 90 per cent of cases, in from ten to fourteen days. Where this is impossible an exploratory laparotomy is indicated.

If the surgeon is allowed to see these patients at an earlier stage of the disease, than is now the practice, and before advanced liver damage has developed, the results of surgical treatment should show considerable improvement. With adequate pre-operative preparation and the use of a two-stage operation in the severe cases, successful surgery should be possible in the majority of cases of obstructive jaundice.

CARDIOVASCULAR CHANGES IN TOXIC GOITRE*

By HARRIS McPHEDRAN

Toronto

IN this paper an attempt is made to review the cardiovascular changes that we have found in connection with toxic goitre. From 1934 to 1940 inclusive, there have been treated in our wards at St. Michael's Hospital 116 cases diagnosed as toxic goitre and operated upon as such. A careful analysis of these cases from the cardiovascular standpoint has been made, and the result of this survey is herewith presented.

Of the total of 116 cases, 56 cases were found to present abnormal cardiovascular findings.

In this latter group, 19, or 33.9 per cent, were found at or below 40, and 37 or, 66.1 per cent, above 40 years of age, with the largest group of all between 50 and 60 years. There were 16 males and 40 females.

KIND OF GOITRE

The toxic goitres encountered were classed clinically as adenomatous and diffuse hyperplastic. Toxic adenomatous goitres were found clinically 28 times, 50 per cent, and diffuse hyperplastic goitres 28 times, 50 per cent.

With this our pathologist, Dr. Magner, does not agree, as in these same cases he diagnosed adenomatous goitre 18 times, and diffuse hyperplastic 38 times. For the discrepancy I have no satisfactory explanation. Ernstene,[1] in reporting 1,000 cases of toxic goitre, states that 488 were diffuse and 472 were adenomatous, or adenomatous and diffuse combined. Twenty-eight cases were reported as of colloid type. It is gathered from his report that these statistics were based on a clinical diagnosis. This is in accord with our clinical findings in these 56 cases.

Cardiac enlargement. — Cardiac enlargement was found by x-ray in 28 of the 56 cases, that is 50 per cent, or in 24.1 per cent of the 116 cases of this series. Of these 28 cases with cardiac enlargement 16 had hypertension. Five had definite endocarditis without hypertension and the endocarditis was considered rheumatic in origin. Seven cases had arteriosclerosis without hypertension.

Twenty of these 28 cases with cardiac enlargement were in the age group 40 to 60 and of these 20 cases 11 had hypertension and three definite mitral stenosis.

Gotta[2] reports that clinically in 200 cases of hyperthyroidism there were 80 cases with normally sized hearts; 64, 1 plus (or borderline) enlargement; 30, 2 plus enlargement; 26, 3 to 4 plus enlargement.

If one considers only those patients in this series of 200 cases with unmistakable cardiac enlargement (2 plus to 4 plus), it is found that they number 56 out of the 200 cases reported, or 28 per cent with definite cardiac enlargement, which closely approximates our own findings of 24.1 per cent.

The following case is reported in detail as he had marked cardiac enlargement of undetermined origin. At first it was thought he had mitral stenosis. This view was subsequently proved incorrect. It also illustrates the difficulty of arriving at a diagnosis of toxic goitre where there is cardiac disease complicating the picture.

CASE REPORT

L.D., aged 25, farmer, was admitted to St. Michael's Hospital June 11, 1938, complaining of shortness of breath, slight œdema of legs, marked fatigue for 4 months, attacks of rapid heart off and on for 12 years, loss in weight of 25 pounds in 3 months, nervousness, irritability, moist hands and feet. There was no history of previous illnesses, except that he was not strong as a child and had had poor health with attacks of rapid heart for 12 years past.

At the time of admission the following observations were recorded.

Lid lag, widening of palpebral fissure, tremor of hands, moist hands and feet, thyroid diffusely enlarged, with right lobe easily palpable and firm, slight œdema of legs, weakness of thigh muscles.

Heart: rate 160, fibrillating. Apex, 14.9 cm. to left of the midsternal line and right border, 5.4 to right of the midsternal line (by x-ray); mitral systolic murmur.

Basal metabolic rate: June 25, 1938, plus 5; July 16th, minus 26; July 26th, minus 27.

Blood: hæmoglobin 100 per cent; Wassermann test, negative.

He had had 900 minims of tincture of digitalis throughout a period of one month prior to admission but the heart rate was 160 on admission. After eight days in bed the heart rate dropped to 80 to 110 without further use of digitalis. This drug was again started in an attempt to lower the rate of the heart still more. Between June 20th and 26th he received 560 minims. It is to be noted that even this large dose of digitalis in 6 days did not lower the heart rate much more than did rest in bed during the eight

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days following admission. Digitalis was discontinued on June 26th, and up to July 5th the heart rate remained 80 to 110 with fibrillation still present. Quinidine was started and in 5 days he had 72 grains at which time he stopped fibrillating. Quinidine was then continued at 5 gr. per day up till the day of operation on July 30th, the heart rate being 80 to 90 per minute.

On July 20th he had precordial distress with a heart rate that could not be counted. Suddenly the rate dropped to 60. In two minutes the heart again was beating rapidly and on holding his breath the rate again dropped to 60 and remained there.

On July 22nd a six-foot plate of the chest showed a heart much diminished in size, *i.e.*, 12.2 cm. to left of the midsternal line and 4 cm. to the right. In spite of the low basal metabolic rates on July 16th and 26th and a heart markedly diminished in size under the treatment outlined, he was considered to have a toxic goitre and was operated upon on July 30th.

The diagnosis was based on the goitre, tachycardia, nervousness, irritability, weight loss, fibrillation resistant to large doses of digitalis, weakness of extensor group of thigh muscles, lid lag and widening of palpebral fissures.

The goitre found at operation was firm and meaty and showed no adenoma. Microscopic examination showed hyperplasia and celloid accumulation.

Following operation the heart rate fell to normal and fibrillation did not recur. There were no further attacks of paroxysmal tachycardia.

The man was last seen on May 21, 1941, and reported that he was working eight hours a day in a garage. The heart is now 4.2 cm. to the right of the midsternal line and 11.4 cm. to the left. He feels perfectly well. There is no mitral murmur present and no sign or symptom of hypothyroidism.

This young man had no hypertension when he was in hospital, nor has he had any at the present time. He had no evidence of arteriosclerosis or lues. There was no history of rheumatism or other disease which might have caused heart damage. He was not an alcoholic and his diet seemed adequate in all respects.

It is said by Gotta[2] that patients such as the above have had organic heart disease and that dilatation takes place as the result of a toxic goitre throwing increased strain on an already damaged heart.

In view of the fact that this patient had been in poor health for 12 years before the operation, with no definite history of a heart damaged by other disease, must he not be considered as a pure case of "goitre heart" and all his signs and symptoms due to a goitre which was toxic over a period of years?

Hypertension.—Taking 140/90 as a starting point for increased blood pressure, hypertension was found in 31 of the 56 cases, that is 55 per cent, or 26.7 per cent of the total 116 cases of toxic goitre. Enlargement in these 31 cases of hypertension was found 16 times and no enlargement 15 times. Electrocardiographic changes and murmurs were most frequent in the cases of hypertension with enlargement. Twenty-three of the 31 cases of hypertension were found to be above, and 8 below 40 years of age.

Electrocardiographic changes. — These were numerous in this group of cases. Of these 56 cases, 30, *i.e.*, 53.5 per cent, showed definite electrocardiographic changes. Fibrillation was the most frequent cardiographic change encountered. It occurred pure or combined in 13 cases of the 56 cases pre-operatively, *i.e.*, 23.2 per cent, or in 11.3 per cent of the total 116 cases. With one exception these patients with fibrillation were over the age of 40, and 7 had hypertension. Six of these cases with fibrillation showed evidence of congestive failure and one of them had mitral stenosis.

TABLE I.

ELECTROCARDIOGRAM CHANGES

	Below 40 years of age	*Above 40 years of age*
Fibrillation only.....	1	10
Flutter fibrillation.....		1
T Changes.....	1	4
Branch bundle..... (one showed fibrillation)	0	2
Left ventricular preponderance.....	2	5
Right ventricular preponderance.....	1 (26 years)	0
Extrasystoles.....	1 (37 years)	0
Paroxysmal tachycardia.. (one showed fibrillation)	1	1

Don and Langley[3] in their series of cases of toxic and non-toxic goitre found fibrillation before and after operation in 10 per cent.

Definite T changes (mostly negative T_2) occurred in 5 of the 56 cases. One had T_1 negative and left axis deviation with hypertension. Four out of the five were hypertensive cases and were over 40 years of age. One had no hypertension, but had T_2 and T_3 negative with angina pectoris.

Two cases in the series of 30 with electrocardiographic changes showed bundle branch block. They stood operation as well as any other cases of toxic goitre, although both were hypertensive cases, and one showed signs of moderate congestive failure. The one without failure but with hypertension and bundle branch block dropped dead one year after operation while running to catch a boat.

Left ventricular preponderance was present in 7 of 35 cases with electrocardiographic change. Four of these were hypertensive cases.

Right ventricular preponderance was present in only 1 of the 35 cases. This patient had mitral stenosis.

Extrasystoles were present in only 1 case and there was no evidence of organic heart disease in this case.

Paroxysmal tachycardia occurred in only two cases. One of these cases showed fibrillation and had a large heart, one other had fibrillation flutter with hypertension.

Murmurs.—These where present in one form or another in 26 of these 56 cases, *i.e.*, 45.9 per cent, or 22.4 per cent of the whole 116 cases of toxic goitre. Of the 26 cases with murmurs, 17 had mitral murmurs, single or combined. In 5 of these 26 cases the murmurs were considered as due to a previous rheumatic endocarditis. Bishop[4] reports that apical systolic murmurs have been noted in 30 to 90 per cent of cases of hyperthyroidism. We found such murmurs in 14.6 per cent of our 116 cases of toxic goitre.

TABLE II.

MURMURS

Single Murmurs		*16 Cases*
Mitral systolic	10	
Pulmonary systolic	5	
Mitral diastolic	1	
Combined Murmurs		*8 Cases*
Mitral systolic, aortic diastolic	1	
Mitral systolic, mitral diastolic	2	
Mitral presystolic, pulmonary systolic	1	
Double mitral, double aortic	1	
Mitral systolic, aortic systolic, pulmonary systolic	1	
Mitral systolic, pulmonary systolic	2	
Unidentified Murmurs		*2 Cases*

Pulse rate and pulse pressure.—Tachycardia next to goitre is the most constant physical finding. In a review of 75 consecutive cases of toxic goitre we found tachycardia present 65 times, *i.e.*, in 86 per cent. Of our 56 cases with abnormal cardiovascular findings we found that 49 cases, or 87.5 per cent had a tachycardia of greater or lesser degree. Seven cases had a heart rate between 70 to 80.

Table III shows the highest, lowest and average heart rates of these 56 cases (1) on admission; (2) 3 days after admission; (3) preoperatively (10 days to two weeks after admission) and post-operatively. Following bed rest only, there was a constant drop in heart rate before iodine was given. The rate of the heart was lowered still further by the use of Lugol's solution and in the majority of cases the pulse rate returned to normal after operation.

Pulse pressure, usually high on admission, dropped with treatment, and the decrease ran parallel to the drop in pulse rate. Bishop[4] says the combination of increased pulse rate and pulse pressure is rarely seen aside from thyrotoxicosis.

Congestive heart failure.—This was found seven times in those cases with abnormal cardiac findings, *i.e.*, 12.5 or 6 per cent of total cases. Six of these seven cases were above 40 years of age. In three there was evidence of organic valvular disease. In all these patients some combination of hypertension, cardiac enlargement, cardiographic changes, murmurs, etc., was present.

TABLE IV.

SHORT SUMMARY OF CHIEF FINDINGS IN THOSE BELOW AND THOSE ABOVE 40 YEARS OF AGE

Total 56	*Number*	*Cardiac enlargement*	*Hypertension*	*Electrocardiographic changes*	*Failure*	*Murmurs*
Below 40	19 (33.9%)	4 (7.1%)	9 (16%)	8 (14.2%)	1 (1.7%)	12 (21.4%)
Above 40	37 (66.1%)	24 (42.8%)	23 (41%)	23 (41%)	6 (10.7%)	14 (25%)

Note that in those above 40 years of age are found the most goitres and a great preponderance of other evidences of cardiovascular disease.

POST-OPERATIVE RESULTS

Of the 56 cases with abnormal cardiac findings who were operated on we had 4 deaths. All these cases had hypertensive heart disease.

A male, aged 66, died from hæmorrhage at site of operation. A female, aged 44, had evidence of congestive heart failure at time of operation although she had had 4 months' rest

TABLE III.

PULSE RATE AND PULSE PRESSURE—56 CASES

	Pulse rate			*Pressure*		
	Highest	*Lowest*	*Average*	*Highest*	*Lowest*	*Average*
On admission	190	80	107	150	30	68
Three days after admission	130	75	98	90	30	57
Preoperatively 10 days—2 weeks after admission	120	60	85	120	30	54
Postoperatively 10 days—2 weeks after operation	100	70	81	100	30	55
Follow up	135 one case	46 heart block	87.1	77	26	48.4

in bed. She had fibrillated throughout these 4 months and in spite of complete digitalization the heart rate never fell below 90 to 110. She died in post-operative shock. At autopsy the heart was found to be essentially normal.

A female, aged 47, died a few hours after operation from collapse of the right lung. This accident had occurred at operation. She had a marked hypertension and enlarged heart but no signs of congestive failure. Bronchoscopy was not attempted. A female, aged 57, died 11 days after operation from bronchopneumonia; she had hypertension but no signs of failure.

The post-operative mortality in the 56 cases was 4 cases or 7.1 per cent of these 56 cases with abnormal cardiovascular findings, and 5 cases or 4.3 per cent of the total of 116 cases. The fifth case who died post-operatively from shock had no evidence of cardiovascular disease.

I am deeply indebted to Drs. Moran, Brown, McConnachie and Sullivan for their help in preparation of this paper.

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TUMOURS OF THE LARYNX*

BY G. W. FLETCHER

Winnipeg

BENIGN tumours, as defined by Sir StClair Thomson are innocent or homologous, of which the tissue and structure correspond to the tissue from which they originate.

A good histological classification has been given by New and Erich as follows:

(*a*) Neoplasms (45.6 per cent)
Tumours of epithelial origin: adenomas, papillomas.
Tumours of connective tissue origin: fibromas, neurofibromas, chondromas and neurochondromas, angiomas, myxomas.

(*b*) Non-neoplastic tumours (54.4 per cent)
Inflammatory tumours, xanthomas, amyloid tumours, epithelial hyperplasias and leukoplakia, prolapse of the ventricle.

The former comprise true neoplastic formations. The second class are the result of chronic inflammation, irritation and misuse of the voice.

These tumours vary from the malignant, inasmuch as they occur in early and middle life and are rare over fifty years of age. They grow away from the tissues, display no inflammatory signs and do not ulcerate.

Papillomata in children present a special problem, as they often proliferate very rapidly, causing great impairment of the voice, and in some cases impede the breathing to such an extent that tracheotomy is necessary. These growths in children are multiple, of a white or pinkish colour, may spread to any part of the larynx or even downwards into the trachea, and tend to recur after removal. They tend to spontaneous atrophy, especially towards the time of puberty, after tracheotomy, and sometimes after infectious diseases.

In adults on the other hand, the growth is single and of a sluggish nature and as a rule does not recur after removal. If there is any doubt of the nature of the growth this may be settled by biopsy.

TREATMENT

In a few cases benign growths may be left alone if causing no symptoms but as a rule removal is called for. In the case of a small growth in an adult removal may be effected by the indirect method if conveniently located. After thorough cocainization and by the use of the laryngeal mirror and the MacKenzie cutting forceps the tumour may be grasped and efficiently removed. This method requires a little practice and has been largely replaced by the use of the direct laryngoscope and direct removal. It has been my practice after removal to cauterize lightly the base of the tumour either with a chemical or the electric cautery.

In some cases in an adult where the tumour is in an inaccessible position or very large it may be necessary to do a thyrotomy.

The treatment of multiple papillomata in children is somewhat of a problem on account of the tendency towards recurrence. Every case should be treated on its merits and some of these cases call for the exercise of all the skill which the surgeon possesses.

As the growths increase in size and the airway becomes impinged upon, tracheotomy may

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be required. This should be done as low down as possible, as cases have been known where the masses have spread into the trachea and appeared on the edges of the tracheotomy wound.

Repeated removal is the method generally recommended and thyrotomy is contraindicated. I have used rayon seeds in two cases in the base of the growth after removal with apparently good results, as in both cases the growths disappeared in a short time.

E. N. Broyles[4] reports five cases which had been treated by the use locally of amniotin (1-10,000 in oil) at intervals of one week. These cases varied in age from five to ten years, and were of an inveterate nature but in all cases a cure was obtained. He does not explain how this substance applied locally operated but if these findings are confirmed it should be a great help in the treatment of these cases.

MALIGNANT GROWTHS

It has been repeatedly stated and I believe this to be true, that early intrinsic cancer of the larynx offers a better prognosis if treated promptly than any other internal cancer in any other part of the body. This can be explained as follows:

The arrangement of the lymphatic system of the larynx is unique. According to Thomson and Colledge, as quoted by John M. Lore,[5] the cavity of the larynx is divided into two lymphatic districts, an upper and a lower, which are separated from one another except for the lymphatics beneath the mucous membrane of the posterior wall. The dividing line of these two areas is the vocal cords, in which the lymphatics are fine and few in number.

The lymphatics in both areas communicate freely across the median line. These lymphatic channels empty by only two lines on each side, one below and one above. The vocal cords anterior to the vocal processes are almost free of lymphatics. This no doubt would explain the late metastasis of laryngeal cancer.

J. E. MacKenty,[1] divides the larynx into favourable and unfavourable areas. Fortunate it is, he remarks, that 80 per cent of laryngeal cancers have their origin in the favourable areas. These he defines as one or other of the vocal cords, or in such proximity to the cords that interference with their function is an early and detectable symptom. A less favourable area is that below the cords. When the whole growth is above the cords early lymphatic involvement soon puts the condition beyond hope of cure.

Cancer never appears simultaneously in two places in the larynx. A cancer on one cord may graft a similar growth on the opposite cord but this secondary growth always gives evidence of its later inception. When this occurs the incipient stage is long past. Experience shows that the surface is usually the point first attacked, and that any part of the cord may be involved, with a strong predilection for the anterior two-thirds.

Incipient cancer in an otherwise normal larynx has the following features. There are no signs of inflammation. It presents a minute excrescence or bulging irregularity of surface, which may be normal in colour or paler than normal and raised above the surrounding surface. It is usually flatly sessile and irregular in outline. Later it may present a broken, warty appearance. Rapid growths often take on a pale yellow or dirty white appearance and assume the well-known cauliflower appearances of malignancy.

On the other hand sub-surface growths may have none of these appearances and may be considerably advanced before they appear. Here infiltration into the muscles causing diminution in mobility of the affected cord may be the first diagnostic change.

Contrary to this may be the picture which appears in an already diseased larynx. Here we are confronted with a difficult problem: only careful observation over some weeks and finally biopsy may give the solution.

It must be emphasized that every case suspected of laryngeal cancer should have a most thorough general examination, mentioning especially a search for signs of tuberculosis both by physical means and x-ray examination of the lungs. The same applies to syphilis, including history, a search for signs and symptoms and a Wassermann test of the blood.

Tuberculosis of the larynx is practically always secondary to the pulmonary disease and the lesions are generally located in the posterior part of the organ. Sometimes it appears in the form of a tuberculoma which may closely resemble a cancerous growth. Here again a biopsy may give the clue.

I do not intend to go into the signs and symptoms of late carcinoma of the larynx, as these are fairly obvious and when the disease

has advanced to this stage the prognosis becomes progressively worse.

In former times there was great argument about the propriety of doing a biopsy on these cases. Some observers contended that there existed a grave possibility that this procedure might lead to a rapid dissemination of the disease, but a review of modern opinion indicates that the great majority of modern observers do not see any harm in the practice. On the contrary many operators carry it out as a matter of routine but insist that it must be properly carried out, that is, they emphasize the necessity of securing a section at the base of the growth where the tissue changes are more likely to be found.

TREATMENT

Most physicians of the present day have agreed that early intrinsic cancer of the larynx is essentially a surgical disease. Among various surgical procedures may be mentioned: (1) Intralaryngeal removal. (2) Thyrotomy or laryngo-fissure. (3) Laryngectomy. (4) Hemilaryngectomy. (5) Partial resection and window resection to apply radium. (6) X-ray and radium. (7) Subhyoid and lateral pharyngotomy.

1. *Intralaryngeal removal.*—This procedure has been carried out by quite a number of operators, with an occasional success, but they do not recommend the operation. They feel that the situation is so grave from the patient's standpoint that no chance should be taken of imperfect removal.

2. *Thyrotomy.*—According to Chevalier Jackson, the only radical treatment of an intralaryngeal malignant growth is excision of the tumour with a surrounding area of healthy tissue, when this is possible. He goes on to say that such cases are those where the growth is situated on the margin or the upper surface of a vocal cord, has not extended backward to encroach upon the arytenoid or crossed the anterior commisure.

Clerf and Crawford[3] of Philadelphia report 6 recurrences in 32 cases. Five of these were of the intermediate group, one anaplastic. Tucker[7] gives the percentage of cures in the Jackson Clinic by thyrotomy as at least 80 per cent. Sir StClair Thomson[6] estimates that about 76 per cent of his thyrotomy cases result in permanent cure.

MacKenty,[1] on the contrary, reports very bad results in a considerable series, but as most of his cases were done early admits that his selection was probably defective. He recommends thyrotomy on only cases with a small growth of a non-anaplastic character and situated near the centre of the cord, and this kind of case he sees so seldom that it is not often that he does this operation.

New and Fletcher, of the Mayo Clinic have made a very constructive and interesting report on 100 autopsies of laryngectomized larynges, in which they detail the distance of local infiltration found in each grade of cancer. Dr. New also reports that in 41 cases of thyrotomy only 13 per cent have had recurrences.

Many others have made similar reports. So uniformly favourable have these reported results been that one must consider laryngofissure an excellent operation in properly selected cases.

3. *Laryngectomy.*—This, declares MacKenty,[1] is a crowning achievement in the annals of surgery. In a series of 100 cases he reports 80 recoveries over a period of years with 6 cases untraced. From 1922 to February, 1926, 58 laryngectomies showed 5 recurrences after three years.

This percentage of cures seems very high when we consider the nature of the disease and the magnitude of the operative procedure, but we must remember that MacKenty considered any growth above the cord as extrinsic. He was extremely conservative in the selection of his cases and did a laryngectomy in many cases where other surgeons might have advised thyrotomy.

This same remark applies to others who have reported long lists of successful cases. Many years ago Gluck and Sverensen reported 160 total laryngectomies with 45 cures. Tapia of Spain who reported 106 total laryngectomies without an operative death and with 74 cures admitted that they were all intrinsic cases which had advanced too far to justify laryngo-fissure.

According to Jackson, if the growth has not only reached but extended along the anterior commisure to the other cord the prognosis is not so good. Laryngo-fissure and a partial laryngectomy may be successful but a complete laryngectomy may be required, particularly if impaired mobility or fixation of the affected side shows that the disease has deeply invaded the tissues.

A complete laryngectomy is required if the intrinsic growth has reached the anterior surface of the arytenoid or has extended to the ventricular band. If the arytenoid or the aryepiglottic fold has been invaded even complete laryngectomy holds but poor promise of a lasting cure.

Extrinsic cases with glandular enlargement offer little hope of cure with any means at our command. I agree with those authors who say that for a highly anaplastic intrinsic tumour of any size whatever, laryngectomy offers the best hope of success.

To recapitulate, then, the sheet anchors of the successful treatment of cancer of the larynx seem to be thyrotomy and complete laryngectomy, and a successful outcome seems to depend upon a nice selection of cases without any undue delays in cases which are considered operative. The grade of tumour also exercises a profound effect upon the prognosis.

Of the subsidiary operative measures little is to be said. Hemilaryngectomy, partial laryngectomy, subhyoid and later pharyngotomy have been successful in the hands of certain individuals in properly selected cases but have never been very largely applied. X-ray and radium therapy have been reported on extensively and are being used on many cases at various parts of the country.

Deep x-ray therapy frequently gives ease to pain and discomfort in certain cases, especially those of an anaplastic nature, and retards at times the progress of the disease. It has also been used both pre- and post-operatively to reach glandular areas and retard the development of the growth in these areas.

Some authors have reported good results in cases of intrinsic carcinoma in which surgery has been declined but neither radium nor x-ray should be used in cases where surgical methods hold out good prospects of lasting cure.

On the whole the treatment of cancer has steadily improved, and prospects for many of these cases are much brighter than in former days. The profession is to be congratulated on the persistent and intelligent efforts they have made to combat this disease.

On the other hand we must admit we have not done as much for the great body of sufferers as we would like to see. We have not found the kernel of the nut, *i.e.*, the cause of cancer. When this happens we may with confidence anticipate more complete results by serological or other means. And, lastly, the cry still goes up—If they would only come to us sooner.

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Case Report

REMOVAL OF A LARGE INTRAVENTRICULAR BRAIN TUMOUR

BY H. H. HEPBURN

Edmonton

Mr. N.H., aged 35 years, was admitted, March 20, 1941, complaining of occasional blurring of vision with dizziness and occasional buzzing in the right ear; undue fatigability; all symptoms of four months' duration. No headaches, but pain in the back of the neck at times.

History.—In 1938 he was admitted to the Provincial Mental Hospital with a diagnosis of manic depressive psychosis, but was only a few weeks in the hospital. It was first discovered on March 13, 1941, that he had a bilateral papillœdema when he consulted a doctor concerning his blurring of vision.

Condition on admission to hospital. — The blood count was normal; the Wassermann reaction negative; cerebrospinal fluid was clear, under high pressure, 32 mm. of Hg. in the horizontal position; cells, 2; colloidal gold 1233221100; the Pandy test was positive; chlorides 0.72 per cent; total protein 56 mgm. per cent. The pupils were equal, and reacted briskly to light; there was severe papillœdema. All the tendon jerks were normal except for the left knee jerk which was slightly increased; abdominal reflexes were absent; Babinski's sign

and Hoffmann's sign were negative. There was some complaint of pain and paræsthesia in the left hip and thigh, but no objective sensory disorders; no muscle atrophy or paresis.

Ventricular puncture, on March 22, 1941, showed both ventricles to be dilated. Fluid from the left ventricle was clear with a total protein of 25 mgm. per cent; fluid from the right ventricle was amber-coloured with a total protein of 2,844 mgm. per cent. Ventriculograms showed dilatation of both lateral ventricles, a pronounced dilatation of the posterior horn of the right ventricle with a large intraventricular filling defect. A diagnosis was made of intraventricular tumour, right side.

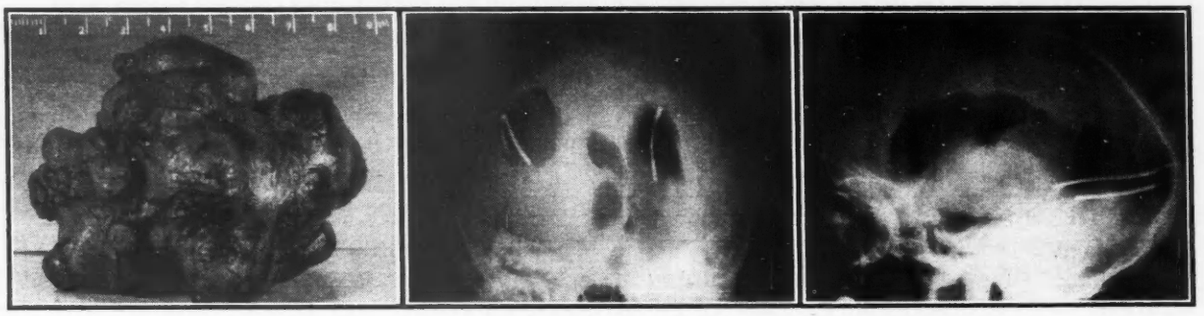

Fig. 1 Fig. 2 Fig. 3

Fig. 1.—(Photograph actual size of tumour). Case of N.H., aged 35. Intra-ventricular tumour attached to choroid plexus of right lateral ventricle. Tumour mostly fibrous. 8 cm. x 6.5 cm. Weight, 115 grams. **Fig. 2.**—Ventriculogram (anterior). **Fig. 3.**—Ventriculogram (posterior).

Craniotomy was performed on March 25, 1941. A large parieto-occipital flap being turned down. The dura was normal and not adherent to the cortex. On palpating the cortex in the right parieto-occipital region a hard underlying tumour could be recognized. An incision was made through the occipital cortex which had been found during ventricular puncture to be less than one cm. in thickness. The incision was started at the ventricular puncture which had been made 4 cm. above the external occipital protuberance and 4 cm. to the right of the midline. The incision was carried upward and forward 8 cm. The tumour was found to be attached to the choroid plexus of the right lateral ventricle. It was necessary to tie off the plexus behind the tumour and later in front of it; no definite attachment of the tumour to the cortex was seen. The tumour was roughly pyramidal in shape, irregular and nodular, obviously fibroid, firmly elastic, measuring 8 cm. x 6.5 cm. x 5.5 cm. It weighed 115 grams in the fresh state.

During the first four days after the operation the temperature ranged between 102 and 103°, dropping to normal in six days; the pulse ranged from 70 to 100. Spinal puncture was done daily for six days, the cerebrospinal fluid was under considerably increased pressure but no growth was obtained on culture. There was no post-operative paresis, as evidenced by the fact that the man got out of bed on the second night and also on the fourth night after operation.

He was allowed up on the fourteenth day and went home on the twenty-first day with no apparent disability other than a left homonymous hemianopsia. Two months from the date of operation he reported doing light work on the farm. On November 23, 1941, he reported by letter that he had been working in a sugar-beet factory for six weeks. He did not even mention any inconvenience from the visual defect.

A deficiency of one vitamin does not produce one specific lesion but a number of lesions which are not all specific to the vitamin in question, and, moreover, most patients suffering from a deficiency of one vitamin are also suffering from deficiencies of several others. The picture produced by a severe deficiency is not merely a more pronounced picture than that produced by a partial deficiency but a more complicated one altogether.—The Avitaminoses, by Walter H. Eddy and Gilbert Dalldorf, Baillière, Tindall & Cox, London, 1941.

Editorials

THE NEW BREAD

IT is in the nature of a dietetic triumph that our Government has now officially recognized and made available to our people a new and improved form of bread. This bread is called "Canada Approved Vitamin B White Bread", and is made from white flour milled in such a way that it retains the various members of the vitamin B-complex naturally present in wheat. The measurement of this retention is standardized through the determination of one of the eight members of the group, namely, thiamin. The flour must contain 400 international units of thiamin per pound. In addition to this it is required that the bread should contain 4 per cent of skim milk solids.

By this means a bread has been obtained which contains a very considerable supply of calcium as well as riboflavin and other members of the B-complex. These are in quantities enough, it is thought, to supply worthwhile amounts of the various B vitamins. Tisdall and others have shown conclusively (*Canad. M. Ass. J.*, 1941, **45:** 101) that the Canadian dietary in a large proportion of the population is seriously lacking in the vitamin B-complex.

In Great Britain and in the United States the problem of restoring the B-complex to bread has also been approached, but in a slightly different way. At first, in Great Britain thiamin was added to the flour artificially. More recently apparently, an 85 per cent extraction flour is being used. This means flour in which only 15 per cent of the wheat grain is not incorporated. It contains the much needed vitamins, and calcium salts are also added, but it makes a darker bread than ours and is that much less popular. The Canada Approved White Bread cannot be distinguished from ordinary white bread as regards colour, texture or flavour.

In the United States there is as yet no set standard for the enrichment of flour but the methods employed tend to the addition of the vitamins and minerals artificially rather than in their natural form. By the artificial addition higher levels of these constituents can be obtained, but in Canada it has been decided to retain them in their natural form so far as is possible. The aim is the same in both cases and the necessary nutritional elements will be provided.

It may not be fully realized, amidst the absorption of all our other preoccupations, that in this respect an important advance has been made in the interests of our national health. Difficulties both of a technical and a sentimental nature have had to be dealt with. They have not yet been entirely overcome, but the members of the profession can do a great deal by drawing the attention of their patients to the value of this new form of white bread over ordinary white bread.

H.E.M.

INTRAGROUP BLOOD TRANSFUSION REACTIONS

HÆMOLYTIC blood transfusion reactions when the recipient's and donor's blood are of the same blood group (A, B, AB or O) are most likely to occur in persons who have had previous blood transfusions or in pregnant or post-partum women (Wiener and Peters[1]). An explanation of some of these incompatibilities between individuals of the same blood group has recently been offered by the discovery by Landsteiner and Wiener[2] of a heretofore undescribed antigenic factor in the blood of 85 per cent of individuals tested, irrespective of their blood group. The other 15 per cent of human beings do not possess this factor.

The above mentioned observers immunized rabbits with the blood of rhesus monkeys and later used this anti-rhesus serum to

1. WIENER, A. S. AND PETERS, H. R.: *Ann. Int. Med.*, 1940, **13:** 2306.

2. LANDSTEINER, K. AND WIENER, A. S.: *Proc. Soc. Exp. Med. & Biol.*, 1940, **43:** 223.

test *in vitro* the blood cells of a large number of people. They found, as stated above, that 85 per cent showed the presence of this rhesus factor which they designated the Rh factor and this proved to be different from other known agglutinogens such as the M and N factors. One has thus to consider an individual's blood for purposes of transfusion as belonging to a certain main blood group subdivided in two, according as the Rh factor is present or absent. For example a group A individual may be either group A Rh+ or A Rh– and the former combination will occur in the proportion of approximately 6 to 1 in each of the four blood groups. If the donor's blood is Rh– no reaction will occur after either the first or subsequent transfusions in a homologous group recipient, irrespective of his Rh status, nor will an Rh+ donor cause a reaction with an Rh+ recipient. An entirely different state of affairs may result, not with the first, but with subsequent transfusions of an Rh– recipient with an Rh+ donor, for in this instance there may be formed in the recipient's blood after a lapse of time anti-Rh antibodies (isoagglutinins) and a hæmolytic reaction will now occur if Rh+ blood is used for transfusion.

The above explains the rationale for the reactions that occur in Rh– recipients after *repeated* transfusions with Rh+ blood. The mechanism is apparently identical in the case of the reactions which occur in pregnant and post-partum women after the *first* transfusion, the only difference being that in this instance the Rh– mother is stimulated to produce Rh agglutinins by her Rh+ fetus and on being transfused with an Rh+ blood will have a reaction. The time appears to be approaching when grouping laboratories will have to include testing for the presence or absence of the Rh factor in both recipients and donors in order to avoid an Rh– individual being immunized during the first transfusion by an Rh+ blood. In this instance in the cross matching for compatibility the probabilities are that the search for an Rh– donor of the homologous group for a repeat transfusion will involve testing at least six donor's bloods until one is found which will not cause clumping *in vitro*, since Rh– individuals only occur in a proportion of 15 per cent. There are other factors which play a rôle in intragroup transfusion reactions, but it appears that the Rh factor plays the major part in the reactions that occur on second transfusions and in ante-partum and post partum women. There is evidence to show that the Rh factor is transmitted as a Mendelian dominant.

Further applications have now been found for the rôle of the Rh factor and its isoagglutinin in the production of morbid conditions. Thus Levine and Katzin[3] suggest that it is the basis for the etiology of erythroblastosis neonatorum, a supposedly congenital disease of infants. They have demonstrated that the majority of mothers bearing such children are Rh– and the children are Rh+. Besides this Rh isoagglutinins were found in some of these Rh– mothers who were examined within a short time of the birth of their abnormal children and the premise is that these maternal Rh agglutinins gain entrance to the fetal circulation and react with the Rh factor in the blood of the fetus to produce the diseased condition, erythroblastosis. There is also some evidence to support the belief that this Rh gene-borne factor may be responsible for the habitual abortion of some women by producing the state of isoimmunization, as it is known that many such women are Rh–.

The above discussion does not include the reactions which occur when different blood groups are inadvertently used for transfusion nor the thermal reactions which occur from faulty technique in using inadequately cleaned apparatus, diluting solution containing pyrogenic substance or improperly stored blood. The usual stringent precautions must be adhered to even after correct blood grouping and cross matching. ARNOLD BRANCH.

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Editorial Comments

Radiologist for University of London

Attention is drawn to the fact that the University of London is inviting applications for the University Chair of Radiology, tenable at the Middlesex Hospital Medical School. The salary is to be £1,500 per annum and applications will be received up till May 26, 1942, by the Academic Registrar, University of London.

The Professor will be an Appointed Teacher. He will be *ex officio* a member of the University Faculty of Medicine and of the University Board of Advanced Medical Studies. He will also be a member of the Middlesex Hospital Medical School Committee. His attendance at meetings of University and College boards and faculties of which he may be appointed a member will be considered as an important part of his work. H.E.M.

Corrigendum

The following correction should be made in Dr. Paul G. Weil's paper on "Shock" in the April issue on page 311, the paragraph which reads: "It is possible that the signs of shock (blood pressure on admission 130/80; no further record of blood pressure) . . ." should read "It is possible that *the absence* of signs of shock (blood pressure on admission 130/80; no further record of blood pressure) . . ."

Men and Books

ON WILLIAM FARR*

BY NOEL R. RAWSON, M.B., B.S.(LOND.), D.P.H.(TOR.)

Director of Vital Statistics, Manitoba, Winnipeg

It is with mixed feelings of diffidence and pride that I stand here today; proud that I, a recent apprentice to the craft of vital statistics have the opportunity to tell the story of our beloved master, William Farr, happy in the honour paid by this invitation to the office which I have the privilege to occupy in this Province. I am, however, fully conscious of my incompetence to do justice to the theme which has been treated so ably by our learned leaders, Sir Arthur Newsholme and Major Greenwood, so delightfully by Mrs. Walker, in her "Pioneers of Public Health". The source of our information on William Farr's life is the biographical sketch by his colleague of many years, Noel Humphreys. G. T. Bettany, charming author of "Eminent Doctors", wrote the account in the Dictionary of National Biography. The part our master played in the building of the edifice of health and public welfare in England is best appreciated by a study of his own writings; the esteem in which he was held is evident from the words of his fellow craftsmen.

Born into a family of small farmers in Shropshire, adopted by a generous-hearted old bachelor, Joseph Pryce, who was devoting his small fortune to the aid of the poor and the welfare of the village in which he resided, William Farr was brought up in an atmosphere of service for others. Having received what scanty schooling the district could offer, he spent his boyhood in close application to study, the classics, history, religion, mathematics.

After two years of apprenticeship in medicine at Shrewsbury, he set forth, on his foster-father's death, to Paris. There André Louis, the indefatigable taker of notes, was teaching that practice should be based on observation, not on hypothesis or foregone conclusions, while the eloquent Andral was lecturing on hygiene from the same standpoint. At Brussels, Quetelet, the astronomer, was studying the mathematical laws of vital phenomena. To quote Farr: "Medicine, like other natural sciences, is beginning to abandon vague conjectures when facts can be accurately determined by observation, and to substitute numerical expressions for uncertain assertions."

Imbued with this spirit, and already showing marked mathematical aptitude, Farr returned to England bent on devoting himself to the promotion of the health and welfare of the people. At that time, 1830, civil hygiene was, as he wrote, at its lowest ebb; it still required the cholera epidemic of 1831-32 to wake the nation out of its lethargy. Trevelyan states that the economic misery, pauperism, starvation and class injustice had brought society to the verge of dissolution. From this the country was saved by the passing of the Reform Act and of subsequent measures

* Delivered at the Section of Historical Medicine of the Canadian Medical Association, Winnipeg, June 26, 1941.

that gave the people a voice in affairs national and local, limited the exploitation of children in factories and set up the Poor Law Commission, with Edwin Chadwick as secretary, to enquire into the conditions of the poor and the reason for their high mortality.

Meanwhile, Farr qualified in medicine, married, and put up his plate. Most of his time, however, was given to medical journalism.

Among his early essays were studies in the history of hygiene; on Moses and his genius in raising a sturdy generation through forty years of hardening in the desert with sound laws of sanitation, on the Epidemics of Hippocrates, and on the part played since Saxon times by the medical profession in the promotion of public health in England. His originality in thought, grace and ease in style, marked Farr already as an accomplished writer. His chapter on Vital Statistics in McCulloch's "British Empire" has been acknowledged the foundation stone of a new science—"Statistics as a guide to practical reform in health".

It opened up two new fields that had, as yet, been barely touched—the responsibility of the state for the health of the people, and the placing of life and health insurance on a sound financial and equitable basis.

The measures which Farr advocated to be taken by the State comprised statistical surveys of the health of the people, health education for the young, revision of medical education and remuneration of the profession with a view to stressing the prevention of disease, support of medical research and planning of towns for the promotion of health.

He urged the principle of life and health insurance, discussing the returns of incidence of disease and mortality in the army and navy and in the experience of Friendly Societies. For greater stability, he considered insurance a duty to be assumed by the government. He revealed the fallacies in the existing life-tables and, after many years of compiling statistics of mortality, he was able to set up tables based on extended national experience, thus rendering premiums equitable.

He became an active member of the Statistical Society, contributed many articles on various economic questions and attended the International Statistical Congresses from the first in 1853 till 1876. He is almost as much a hero of the actuaries as of the vital statisticians.

His early writings, with their clear presentation of the objects of hygiene, their sound mathematical judgment and attractive diction, gained the attention of Edwin Chadwick, Thomas Wakley of *The Lancet*, and Sir James Clark, first physician to Her Majesty, Queen Victoria; they procured for their author the post of Compiler of Abstracts at the newly founded General Register Office at Somerset House in London.

These men had recognized in the registration of deaths a fine opportunity to obtain a record of the state of health of the people, and so had obtained the insertion in the registers of a column for information on the cause of death, such information to be supplied by the medical attendant, if any, on the deceased. It was to arrange and present this information in a precise, yet comprehensive and readily understood form that William Farr was appointed to the post he held for forty years. "Forty years", wrote Noel Humphreys, "almost exclusively devoted to the, to him, congenial task of creating and developing a national system of vital statistics, which has not only popularized sanitary questions in England in such a way as to render rapid health progress an accomplished fact, but it has practically been adopted in all civilized countries in the world."

Forty years, that covered the stage of sanitation that prepared the way for the more definite battle against the germs of disease, the age of bacteriology; it was the formative period in which ideas were shaped and laws were framed, the people made conscious of the value of health, the statesmen of their responsibility for the health of the people—in all of which William Farr played a foremost part. His forty-one annual reports to the Registrar General consisted of tables and a series of letters in which many subjects were discussed, many issues raised; they reveal a ready grasp of the problems of the day and disclose a healthy pride and steadfast faith in the strength and wisdom of the English. In his opening letter, dated 6th of May, 1839, he explained the aim and the scope of the task before him:

> "The deaths and causes of death are scientific facts which admit of numerical analysis. Diseases are more easily prevented than cured, and the first step to their prevention is the discovery of their exciting causes. The registry will show the agency of those causes by numerical facts, and measure the intensity of their influence."

To present these facts, Farr decided to group the causes of death according to their mode of action and the means of their prevention, the

communicable diseases, the general or constitutional, the systemic, those associated with a particular period of life, and external causes. His system is the basis of all international lists that have been used since it was first adopted in 1856.

During the first fifty years of the industrial revolution, men and women with their families had swarmed into the cities and towns in search of work. They found refuge in garrets or cellars, crowded fifteen or so to a room. Tenements—so-called rookeries—were built in small squares or courts, there was little sanitation, in the middle of the court might be a dunghill of human excreta, under the building a cesspool. Burial grounds were within the city, factories polluted the air with their smoke and stench. Filth, destitution and misery prevailed.

As Secretary of the Poor Law Commission, Chadwick wished to prove that these conditions caused much unnecessary disease and death, but for this he needed figures and these Farr supplied. They enabled the passing of the first Public Health Act in 1848. Later they provided ammunition for John Simon as health officer of the Privy Council; they led to the appointment of medical officers of health to the cities, and, in 1870, helped persuade the Royal Commission of the need for more active measures and so secured the Public Health Act of 1875.

As a standard for comparison he set up the mortality experience of 63 of the healthiest districts in England, where the annual death rate was not more than 17 per thousand population, that of industrial towns being 27 and even up to 36. While the crude rate gives a ready means of comparison, he realized that it depends largely upon the average age of the population. He found the only scientific means of comparison to be the life-table, or the mortality rate at different ages. Probably the best measure of sanitation is the infant mortality rate. Farr found that of one thousand children born into the healthy districts 175 would die in the first five years; in Liverpool, 460.

He was able to show that, by and large, there was a definite relation between the rate of mortality and the density of the population, though he recognized that it was merely insofar as this determined the chances of infection. He urged the mitigation of these chances through the removal of the polluted atmosphere by ventilation with wide streets, squares and parks; of garbage by scavenging, of excreta by sewerage, safeguarding of the water supply, ample supply of food, comfortable housing and cleanliness. "A man", said Farr, "may expect to live long in the land if he keeps the divine commandments brought down and proclaimed by science."

But was this saving of life desirable?

The Malthusians regarded the efforts of public health as futile, since the population always presses on the means of subsistence, and the weaklings that are raised by increasing care tend to dilute the vigour of manhood. Even among the medical officers of health there were those who saw in the high mortality of childhood a safeguard against death of the nation by slow starvation through excess numbers. Farr replied:

> "Where there is great negligence, great ignorance, great privation, the weaklier lives are cut off, but it must also be borne in mind that many of the strongest children are wounded and left weakly for life. The very conditions which diminish the numbers killed in the battle of life diminish the number of wounded. By removing the discovered causes of death you, at the same time, remove conditions which prevent the progress of the English race. The population in England will not increase faster than the requirements of industry or the openings of colonial enterprise. We have, therefore, everything to hope and nothing to dread from measures of public health and of public safety. Statesmen need not be deterred from the noblest work in which they can be engaged."

Farr's ideas of the exciting causes of epidemic diseases (zymotic, as he called them, from the resemblance of their action to the fermentation of leaven) advanced with the times; in his earlier letters he writes of specific principles of disease; later, of highly organized particles, not living but dead; finally, after Pasteur's description of living molecules in silkworm disease, he speaks of low corpuscular forms of life which, though of no recognized form, thrive, propagate and die in the bodies of men, disintegrating and devitalizing their tissues. The day of bacteriology was dawning which would guide with its light the work of sanitation, reveal the enemy as a palpable entity and extend protection against it by vaccination and immunization.

Farr was a thorough believer in the efficacy of vaccination, even as performed in his day, when the lymph was often impotent and revaccination rare. He was able to demonstrate from the statistics of the epidemic of 1871 that those vaccinated had six times more chances of escaping the disease than the unvaccinated, and five times the chance of recovery if attacked.

He held that to be really effective in the reduction of mortality, vaccination must be given for all diseases for, where sanitation is lacking, protection against one disease only opens the

door for others, as seen in Glasgow early in the 19th century when even though vaccination had reduced smallpox deaths to a fifth of their original number, children died in nearly the same numbers as before, but of other forms of disease, notably measles; as also in England after the introduction of compulsory vaccination in 1853.

Farr held that the organized particles produced disease by combination with certain "gemmules" present in the body from birth, that these gemmules were then used up and could not be reformed, that they could also be used up by a milder form of disease, as by that following vaccination, or that they might be absent from birth; thus the various types of immunity, acquired and inherent.

Farr found the primary object to aim at is having a healthy stock of men in conditions of air, water, warmth, food, dwelling and work most favourable to their development. The vigour of their own life is the best security men have against the invasion of their organization by low corpuscular forms of life. Vaccinate, by all means, but at the same time provide streets, space, dwellings, water, drainage. What are municipal bodies good for unless they can, through administrative measures, replace rookeries by healthy habitations, supply the people with pure water and the means of cleanliness, so to produce a healthy stock of men:

"The higher hygiene seeks to influence the unborn child by placing the mother in favourable conditions; behind this again it goes to the foundation itself of families —marriage. The hygienic problem is how to free the English people from hereditary disease and hereditary taints, to develop the athletic, æsthetic, moral and intellectual traits."

The death of a mother in childbed has always had a special appeal. Farr makes constant reference to this problem—the recorded incidence differed little from that of today. About five births in every thousand were fatal to the mother —rather less than 1 in 130 of all deaths; it is not the number which causes concern, but the occurrence at a time when life is most precious and the fact that so often the death could have been prevented.

Farr upheld the attendance on mothers by midwives as an excellent and natural arrangement; he had witnessed the fine training given at the Hôtel de la Maternité in Paris; he came to London to find the nursing largely left to untrained spirit-drinking women, underpaid and of an inferior class, who not infrequently demoralized the mother and poisoned the child, thwarting the intentions of the medical attendant by their ignorant self-confidence. Lying-in hospitals proved a failure; the assemblage of child-bearing women under one roof gave rise to fatal epidemics of childbed fever. It was in this connection that Farr became associated with Florence Nightingale. Their principle, the supplying of an adequate, trained midwifery service, has become the guiding light of English practice. At Farr's instigation, in 1870, the Obstetrical Society proposed the registration of women practising midwifery, and the establishment of training schools for them throughout the kingdom, but it was not until much later, in the early years of this century, that these reforms became established. Finally, in 1936, provision was made for the attendance on every woman in childbed of a salaried trained nurse.

Farr always took a keen interest and was an active agent in reform in medical practice; in the establishment of a nomenclature of disease which led to keener precision of thought; in the registration of medical practitioners; in the inclusion of midwifery in the medical curriculum and, as we have seen, in the appointment of medical officers of health.

He received many honorary degrees and, on his retirement in 1879, he was made Companion of the Order of the Bath. By his medical confrères he was paid the highest honour they could bestow, the gold medal of the British Medical Association—"On account of the extraordinary service his work has rendered to the advancement of the health of the nation."

Of his annual reports it was written:

"Through these letters the information to be derived from the huge mass of records was made known to the public; his lucid and simple language, his common sense, his picturesque style invested dry facts with popular interest. The figures collected by him, the principles which he deduced from them and the accomplished skill with which he impressed the doctrines of sanitary law upon statesmen and upon the public mind, have done more to forward the progress of sanitation throughout the world than the labour perhaps of any other man who could be named."

He was known as a delightful and delighted host, friends spoke of his joyous musical laugh, his genial modesty and his ever ready appreciation of others in the field—he was a most lovable man. His writings display a constant faith in the design of his Master; one feels that he can never have been far from the centre, but ever kept in view the bright star of his destiny; as he said of the English race: "There is a Divine Image in the future to which the nation must aspire."

I wish to express my gratitude to those who have helped with suggestions, the loan of books and the preparation of photostats—to Dr. R. H. Coats, Dominion Statistician; Dr. A. W. Hedrich, Director of Vital Statistics, Maryland; Dr. W. W. Francis of the Osler Library, Montreal; the Vicar of Dorrington, Shropshire; Mr. Ritchie and others of the Sun Life Assurance Co.; Miss O. E. Somerville of the School of Hygiene, Toronto; and the librarians of the Royal Society of Medicine, London, England; the Army Medical Library in Washington; McGill University; the University of Toronto; the Academy of Medicine, Toronto; and the Medical Library, University of Manitoba.

Program

THE SEVENTY-THIRD ANNUAL MEETING

of the

Canadian Medical Association

JASPER PARK, JUNE 15, 16, 17, 18, 19, 1942

Convention Headquarters—Jasper Park Lodge

President - - - DR. GORDON S. FAHRNI, Winnipeg

President-Elect - - DR. A. E. ARCHER, Lamont

General Secretary - - DR. T. C. ROUTLEY, Toronto

A Message from the President-Elect

On behalf of the members of the Alberta Division of the Canadian Medical Association, comprising, as they do, almost the entire medical population of the province, I wish to extend a cordial invitation to the members of the profession across Canada to attend the Annual Meeting at Jasper Park Lodge during the week beginning June 15th.

This year we celebrate the 75th anniversary of the organization of the Canadian Medical Association. In happier times this significant anniversary would have been suitably recognized. We would have been inviting our confrères to the Jasper Meeting with a full scientific program and in addition we would be planning and expecting a meeting in which social functions and recreation would have been prominent, and every facility would have been provided to take full advantage of a holiday in this great National Playground. Meeting, as we will be, under the stress and anxiety of a great struggle, the program will be influenced by the pressing problems confronting us. The meeting of the General Council on Monday and Tuesday will face again the important problems raised by the present active study of Health Insurance, and the attempt to frame a plan which may become the basis of legislation. With almost 20 per cent of our profession in uniform, it is fitting that a much larger opportunity than usual be provided for the discussion of special war problems. This has been arranged for in the Round Table on War Medicine and the meetings of the section of Military Medicine. It is expected that we will have the honour of having with us the Senior Medical Officers of the fighting services. Their presence and participation will add much to these sessions.

The local program committee has been very active. Its suggestions have been considered by the Central Program Committee and under their expert guidance a fine program has been finally arranged. The profession owes a debt of gratitude to these men and also, in these busy days, to the many men, leaders in their various fields of work, who are contributing to this program. Recognizing the importance of the Health Insurance discussions, Thursday evening is being set aside for a discussion on this subject under the leadership of Dr. Wallace Wilson. This meeting will be of great interest this year, as the profession generally are fully aware of the urgency of this question. The Alberta profession are deeply conscious of the courtesy and co-operation offered by the British Columbia and Saskatchewan Divisions in moving their annual meetings to Jasper this June. Their presence as Divisions is greatly appreciated and will be most helpful.

The Committees planning for the entertainment of our guests are happy that the Convention is meeting this year in beautiful Jasper Park Lodge. Their plans are informal and their main purpose is to help all our guests to enjoy, as fully as possible, under the circumstances, the pleasures and beauty of Jasper Park. The Ladies' Committee are hoping that a large number of the members in attendance will be accompanied by their wives. They wish to help make the visit to Jasper memorable. Golf and putting tournaments have been arranged, and there will be facilities for boating, fishing, swimming, tennis and hiking or mountain climbing for those interested. It is the Committees' aim to make this convention outstanding in its planning for the advancement of the health interests of our country and at the same time, of sound scientific value. That this work can be done surrounded by the peace and splendour of Jasper Park, will lighten this arduous and necessary work of the convention to a degree unusually welcome at this time.

While recent war time regulations have interfered somewhat with the entertainment plans, the Committee are expecting to be able to make

arrangements to ensure a reasonable amount of sight-seeing in the Jasper area. The accommodation at Jasper Park Lodge is provided in a series of beautiful comfortable rustic cabins. These are all near the main Lodge in which the dining room, ball room, lounge and office accommodation are located. This arrangement means that guests will walk varying distances from their rooms to the Lodge for meals, and meetings. It is planned that entertainment will be informal, and the co-operation of the Jasper Park Lodge and Park Officials will help to make this meeting an outstanding success.

A. E. ARCHER.

Committee on Arrangements

(Resident in Edmonton unless otherwise indicated)

General Chairman
DR. A. E. ARCHER, LAMONT
President-Elect, Canadian Medical Association

General Secretary
DR. T. C. ROUTLEY, TORONTO

Local Chairman
DR. G. N. ELLIS
President, Edmonton Academy of Medicine

Local Vice-Chairman
DR. J. W. SCOTT
Past-President, Edmonton Academy of Medicine

Local Honorary Secretary
DR. J. ROSS VANT
President, Alberta Division, C.M.A.

Subcommittees

BADGES, SIGNS AND FLAGS—DR. E. S. ALLIN, *Chairman.*
DR. F. W. LAW, *Secretary.*

CEREMONIAL PROCEDURE—DR. W. A. SCANLON, *Chairman.*

COMMERCIAL EXHIBITS—DR. A. F. ANDERSON, *Chairman.*
DR. C. S. DOBSON, *Secretary.*

ENTERTAINMENT—DR. D. B. LEITCH, *Chairman.*
DR. A. DAY, *Secretary.*

EQUIPMENT—DR. MAX CANTOR, *Chairman.*

FINANCE—DR. W. A. WILSON, *Chairman.*
DR. N. E. ALEXANDER, *Secretary.*

Subcommittees—*Continued*

GOLF—DR. G. F. ELLIOTT, *Chairman.*
DR. W. HUSTLER, *Secretary.*

HOUSING—DR. G. GRAY, *Chairman.*

LIAISON WITH LADIES' COMMITTEE—DR. D. B. LEITCH, *Chairman.*

PUBLICITY—DR. J. O. BAKER, *Chairman.*
DR. R. F. NICHOLLS, *Secretary.*

REGISTRATION AND INFORMATION—DR. A. MCGUGAN, *Chairman.*

SCIENTIFIC EXHIBITS—DR. J. W. MACGREGOR, *Chairman.*

TRANSPORTATION—DR. J. K. FIFE, *Chairman.*

Local Program Committee

DR. HAROLD ORR, *General Chairman.*

ANÆSTHESIA—DR. E. H. WATTS, *Chairman.*
DR. W. S. JOHNS, CALGARY, *Secretary.*

DERMATOLOGY—DR. HAROLD ORR, *Chairman.*
DR. A. G. DUNCAN, CALGARY, *Secretary.*

HISTORY OF MEDICINE—DR. H. C. JAMIESON, *Chairman.*
DR. MAX CANTOR, *Secretary.*

MEDICINE—DR. E. L. POPE, *Chairman.*
DR. G. R. DAVISON, *Secretary.*

MILITARY MEDICINE—DR. WALTER SCOTT, *Chairman.*
MAJOR C. E. ANDERSON, *Secretary.*

OBSTETRICS AND GYNÆCOLOGY—DR. J. ROSS VANT, *Chairman.*
DR. A. DAY, *Secretary.*

OPHTHALMOLOGY AND OTOLARYNGOLOGY—
DR. M. R. LEVEY, *Chairman.*
DR. E. F. FOY, *Secretary.*

PÆDIATRICS—DR. D. B. LEITCH, *Chairman.*
DR. J. CALDER, *Secretary.*

RADIOLOGY—DR. A. D. IRVINE, *Chairman.*
DR. R. W. BOYD, CALGARY, *Secretary.*

SURGERY—DR. W. F. GILLESPIE, *Chairman.*
DR. N. E. ALEXANDER, *Secretary.*

UROLOGY—DR. G. N. ELLIS, *Chairman.*
DR. F. PILCHER, CALGARY, *Secretary.*

Central Program Committee

LOCATED IN TORONTO

Drs. Duncan Graham (*Chairman*), Harvey Agnew, Alan Brown, H. K. Detweiler, H. A. Dixon, J. H. Elliott, Roscoe Graham, J. C. McClelland, A. E. MacDonald, G. E. Richards, T. C. Routley, Wm. Scott, H. J. Shields, D. E. S. Wishart, George S. Young.

GENERAL PROGRAM

Friday and Saturday, June 12th and 13th, Executive Committee Sessions

MONDAY, JUNE 15TH

9.00 a.m.—Registration.

9.30 a.m.—Meeting of General Council.

12.30 p.m.—Luncheon.

2.00 p.m.—Meeting of General Council.

6.00 p.m.—Meeting of Nominating Committee.

7.30 p.m.—Barbecue for members of General Council and their ladies as guests of the Alberta Division.

TUESDAY, JUNE 16TH

9.00 a.m.—Registration.

9.30 a.m.—Meeting of General Council.

All Day—Golf Tournament.

12.30 p.m.—Luncheon.

2.30 p.m.—Business Meeting of Saskatchewan Division.

7.30 p.m.—Medical Secretaries' Dinner and Conference.

8.00 p.m.—Business Meeting of Alberta Division.

8.00 p.m.—Business Meeting of British Columbia Division.

WEDNESDAY, JUNE 17TH

8.30 a.m.—Registration.

9.00 a.m.—Round-Table Conferences.

10.15 a.m.—General Session.

12.30 p.m.—Luncheon.

2.00 p.m.—Sectional Meetings.

3.45 p.m.—Annual Meeting Canadian Medical Protective Association.

8.30 p.m.—Annual General Meeting, to which are invited all members and their ladies, guest speakers, official delegates and official guests.
Presentation of medals and awards.
Installation of President.
Reception by the President and Mrs. Archer.

10.30 p.m.—Dance.

THURSDAY, JUNE 18TH

8.30 a.m.—Registration.

9.00 a.m.—Round-Table Conferences.

10.15 a.m.—General Session.

12.30 p.m.—Luncheon.

2.00 p.m.—Sectional Meetings.

2.15 p.m.—Meeting of Incoming Executive Committee.

8.45 p.m.—Presentation of Golf Prizes.

9.00 p.m.—Medical Economics Program under the Chairmanship of Dr. Wallace Wilson of Vancouver.

Thursday, June 18th—*Continued*

Federation of Medical Women of Canada

7.45 a.m.—Breakfast.
Executive Meeting.

12.00 noon—Reception—Luncheon.
Annual Meeting.
Guest Speakers:
Dr. Edna Guest, O.B.E., National Chairman, War Services Committee.
Dr. Lillian Chase, Vice-president, Saskatchewan.
Dr. Eleanor Percival, Convener, Maude Abbott Memorial Scholarship Fund.
Dr. Mildred Newell, Edmonton, President.
Dr. Katherine Ketchum, Toronto, Secretary.
Dr. Agnes Moffatt-Magee, Peterborough, Treasurer.

FRIDAY, JUNE 19TH

8.30 a.m.—Registration.

9.00 a.m.—Round-Table Conferences.

10.15 a.m.—General Session.

12.30 p.m.—Luncheon.

2.00 p.m.—Sectional Meetings.

SCIENTIFIC PROGRAM

ROUND-TABLE CONFERENCES

WEDNESDAY MORNING, JUNE 17TH

Section of Anæsthesia

Problems of respiration and anoxæmia.

Dr. D. C. Aikenhead (*Chairman*), Winnipeg
Dr. Digby Leigh, Montreal
Dr. E. H. Watts, Edmonton

Section of Dermatology

Syphilis.

Dr. Donald H. Williams (*Chairman*), Vancouver
Dr. E. H. Cleveland, Vancouver
Dr. J. F. Burgess, Montreal

Section of Medicine

The selection of sulfanilamide and related compounds in medical treatment.

Dr. Duncan Graham (*Chairman*), Toronto
Dr. H. K. Detweiler, Toronto
Dr. Irving Bell, Edmonton

Wednesday Morning, June 17th—*Continued*

Section of Obstetrics and Gynæcology

Rational endocrine therapy in obstetrics and gynæcology.

Dr. Ross Mitchell (*Chairman*), Winnipeg
Dr. Allan Day, Edmonton
Dr. H. B. VanWyck, Toronto

Section of Pædiatrics

Adolescent problems.

Dr. A. Howard Spohn (*Chairman*), Vancouver
Dr. U. J. Gareau, Regina
Dr. G. E. Swallow, Edmonton

Section of Radiology

Radiotherapy of non-malignant diseases.

Dr. B. J. Harrison (*Chairman*), Vancouver

Wednesday Morning, June 17th—*Continued*

Section of Surgery

Problems in bile tract surgery.
Dr. Roscoe R. Graham (*Chairman*), Toronto
Dr. P. H. T. Thorlakson, Winnipeg

THURSDAY MORNING, JUNE 18TH

Joint Conference including all Sections

The use and abuse of vitamins.
Dr. F. F. Tisdall (*Chairman*), Toronto

FRIDAY MORNING, JUNE 19TH

Section of Dermatology and Radiology

Cutaneous cancer.
Dr. Harold Orr (*Chairman*), Edmonton
Dr. Norman Wrong, Toronto
Dr. B. R. Mooney, Winnipeg

Section of Medicine

Recognition and treatment of poliomyelitis in general practice.
Dr. J. D. Adamson (*Chairman*), Winnipeg
Dr. O. J. Day, Winnipeg
Dr. F. H. Mewburn, Edmonton

Section of Obstetrics and Gynæcology

The treatment of prolapse.
Dr. J. R. Vant (*Chairman*), Edmonton
Dr. T. E. Clarke, Edmonton
Dr. Edwin M. Robertson, Kingston

Section of Pædiatrics

Pædiatric prevention of future foot disorders
Dr. Graham Huckell (*Chairman*), Edmonton
Dr. R. P. Kinsman, Vancouver
Dr. R. G. Townsend, Calgary

Section of Radiology

Presentation and discussion of interesting films.
Dr. W. H. McGuffin (*Chairman*), Calgary

Section of Surgery

Principles and practice in wound treatment.
Dr. C. W. Burns (*Chairman*), Winnipeg
Dr. F. I. Lewis, Toronto

Friday Morning, June 19th—*Continued*

Section of Urology

Urinary complications following rectal surgery.
Dr. Frank S. Patch (*Chairman*), Montreal

GENERAL SESSIONS

WEDNESDAY MORNING, JUNE 17TH

History-taking
Dr. George S. Young, Toronto.

Amputations and after-care
Dr. H. K. MacDonald, Halifax.

The Presidential Address
Dr. Gordon S. Fahrni, Winnipeg.

The Osler Lecture
Dr. C. D. Parfitt, Toronto.

THURSDAY MORNING, JUNE 18TH

Industrial medicine
Dr. J. G. Cunningham, Toronto.

National health as a post-war problem
Dr. R. E. Wodehouse, Ottawa.

The treatment of psoriasis (illustrated with coloured motion pictures)
Dr. Paul O'Leary, Rochester, Minn.

Iodized oil in the diagnosis of non-tuberculous pulmonary diseases by means of bronchography.
Dr. Carleton B. Peirce, Montreal.

FRIDAY MORNING, JUNE 19TH

Essential features concerning the proper nutrition of the infant and child
Dr. Alan Brown, Toronto.

Head injuries in war
Dr. W. G. Penfield, and
Dr. William Cone, Montreal.

Common eye diseases, diagnosis and treatment (illustrated by kodachrome slides)
Dr. Lloyd Morgan, Toronto.

Radiological interpretation in gynæcology
Dr. Léon Gérin-Lajoie, Montreal.

SECTIONAL MEETINGS

Section of Anæsthesia

WEDNESDAY AFTERNOON, JUNE 17TH

Intravenous anæsthesia

Dr. S. W. Johns, Calgary.

Mortality and morbidity following surgery in a large general hospital

Dr. D. C. Aikenhead, Winnipeg.

Oxygen therapy and resuscitation

Dr. Digby Leigh, Montreal.

Continuous spinal anæsthesia

Dr. E. H. Watts, Edmonton.

Section of Dermatology

WEDNESDAY AFTERNOON, JUNE 17TH

Lupus erythematosus

Dr. A. G. Duncan, Calgary.

Sarcoidosis; systemic and cutaneous manifestations

Dr. G. S. Williamson, Ottawa.

Dermatoscleroses (illustrated with coloured motion pictures)

Dr. Paul O'Leary, Rochester, Minn.

Ointment bases

Dr. L. P. Ereaux, Montreal.

FRIDAY AFTERNOON, JUNE 19TH

Recurring vesicular eruptions of the hands

Dr. A. M. Davidson, Winnipeg.

The weather and the patient's skin

Dr. Norman Wrong, Toronto.

Vitamins in dermatology

Dr. J. F. Burgess, Montreal.

The rôle of the medical profession in venereal disease control in British Columbia

Dr. Donald H. Williams, Vancouver.

Section of Historical Medicine

THURSDAY AFTERNOON, JUNE 18TH

The social history of medicine—a commentary on newer trends

Dr. M. M. Cantor, Edmonton.

William Smellie

Dr. Ross Mitchell, Winnipeg.

The medical sources of Dr. Jekyll and Mr. Hyde

Dr. E. P. Scarlett, Calgary.

Section of Historical Medicine—*Continued*

FRIDAY AFTERNOON, JUNE 19TH

Dr. Michael Clark

Dr. G. D. Stanley, Calgary.

Jerome Cardan

Dr. H. E. MacDermot, Montreal.

Baron Larrey—Surgeon General to the Army of Napoleon

Dr. A. R. Munroe, Edmonton.

The trails of the early doctors in the central prairies

Dr. J. A. Valens, Saskatoon.

Section of Medicine

WEDNESDAY AFTERNOON, JUNE 17TH

The recognition and management of the early apical lesion

Dr. A. H. Baker, Calgary.

Silicosis

Dr. E. P. Scarlett, Calgary.

Facts on rheumatoid arthritis

Dr. L. DeWitt Wilcox, London.

Vocational guidance, occupational adjustment and medicine

Dr. Donat Voghel, Montreal.

THURSDAY AFTERNOON, JUNE 18TH

Some common functional diseases of the intestines and their management

Dr. P. H. Sprague, Edmonton.

Lipæmic hyperthyroidism

Dr. Eldon M. Boyd, and
Dr. W. Ford Connell, Kingston.

Œdema

Dr. George C. Hale, London.

Bromide intoxication

Dr. H. K. Detweiler, Toronto.

FRIDAY AFTERNOON, JUNE 19TH

Some obscure pains in the chest, back or limbs

Dr. Gerard Allison, Winnipeg.

Cardiac pain

Dr. G. F. Strong, Vancouver.

The interpretation of faint heart sounds

Dr. Harold N. Segall, Montreal.

Climatic factors in disease

Dr. J. W. Scott, Edmonton.

Section of Obstetrics and Gynæcology

THURSDAY AFTERNOON, JUNE 18TH

Sterility in the female
Dr. J. E. Harrison, Vancouver.

The management of the third stage
Dr. W. S. Holmes, Saskatoon.

Breech presentation
Dr. Arthur Nash, Victoria.

FRIDAY AFTERNOON, JUNE 19TH

The treatment of fibroids of the uterus
Dr. J. D. McQueen, Winnipeg.

Vaginal discharge; diagnosis and treatment
Dr. E. M. Robertson, Kingston.

Antepartum hæmorrhage
Dr. H. B. VanWyck, Toronto.

A five year summary of maternal deaths in Alberta
Dr. J. R. Vant, Edmonton.

Section of Ophthalmology

FRIDAY AFTERNOON, JUNE 19TH

Recent advances in medical therapy of the eye
Dr. A. E. Shore, Calgary.

Difficulties and complications in the senile cataract operation
Dr. R. J. P. McCulloch, Toronto.

One of the phases of plastic surgery of the eyelids
Dr. Fulton Risdon, Toronto.

Vertical phorias, operative and non-operative
Dr. Charles E. Davies, Vancouver.

Section of Otolaryngology

WEDNESDAY AFTERNOON, JUNE 17TH

Surgery of the mastoid
Dr. Joseph A. Sullivan, Toronto.

Headache of nasal origin
Dr. G. Edward Tremble, Montreal.

The sinus problem
Dr. Keith Hutchison, Montreal.

Recent advances in medical therapy in diseases of the ear, nose and throat
Dr. F. D. McKenty, Winnipeg.

Sudden deafness
Dr. A. L. Yates, Calgary.

Section of Pædiatrics

THURSDAY AFTERNOON, JUNE 18TH

Anorexia of childhood
Dr. G. E. Swallow, Edmonton.

Second year anæmias
Dr. A. E. M. Cairns, Lethbridge.

Allergic problems
Dr. Gordon Chown, Winnipeg.

Prevention of bullous impetigo in hospital nurseries
Dr. R. P. Kinsman, Vancouver.

FRIDAY AFTERNOON, JUNE 19TH

Convulsions
Dr. H. W. Price, Calgary.

Meningitis in childhood
Dr. Nelles Silverthorne, Toronto.

Progress in poliomyelitis
Dr. O. J. Day, Winnipeg.

Clinical study of western variety encephalitis occurring in young infants
Dr. Harry Medovy, Winnipeg.

Section of Radiology

WEDNESDAY AFTERNOON, JUNE 17TH

Luetic disease of the bone
Dr. S. M. Rose, Lethbridge.

Primary tumours of the bone
Dr. M. C. Morrison, London.

(Subject of choice)
Dr. J. E. Perron, Quebec.

Inherent filtration of x-ray tubes
Mr. Dale Trout, Chicago.

THURSDAY AFTERNOON, JUNE 18TH

An analysis of carcinoma of the colon, commenting on the accuracy of radiological diagnosis
Dr. M. M. R. Hall, Toronto.

Remarks on the nature of cancer
Dr. B. J. Harrison, Vancouver.

Tomographic studies of the thoracic viscera
Dr. Carleton B. Peirce, Montreal.

Section of Surgery

WEDNESDAY AFTERNOON, JUNE 17TH

Surgical principles in compound fractures
Dr. R. G. Townsend, Calgary.

The management of un-united fractures of the neck of the femur
Dr. F. I. Lewis, Toronto.

Surgical care of poliomyelitis
Dr. F. H. H. Mewburn, Edmonton.

Spondylolisthesis
Dr. R. I. Harris, Toronto.

THURSDAY AFTERNOON, JUNE 18TH

Failures in inguinal hernia
Dr. R. L. Anderson, Edmonton.

Present status of duodenal ulcer surgery
Dr. M. A. R. Young, Lamont.

The early diagnosis of cancer
Dr. M. R. MacCharles, Winnipeg.

Surgical problems of the navy
Surgeon Lieutenant Commander Walter C. MacKenzie, R.C.N.V.R., St. John's, Nfld.

FRIDAY AFTERNOON, JUNE 19TH

Indications for thyroidectomy in the presence of a normal basal metabolic rate
Dr. J. K. Fife, Edmonton.

Clinical application of present-day knowledge of surgical shock
Dr. H. V. Morgan, Calgary.

Physiological problems in intestinal obstruction
Dr. Norman B. Taylor, Toronto.

The surgical treatment of congenital hydrocephalus
Dr. H. H. Hepburn, Edmonton.

Section of Urology

WEDNESDAY AFTERNOON, JUNE 17TH

Retroperitoneal tumours in children
Dr. Frederick Pilcher, Calgary.

Strictures of the ureter
Dr. H. D. Morse, and
Dr. C. B. Stewart, Winnipeg.

Carcinoma of the prostate
Dr. Frank S. Patch, Montreal.

Section of Urology—*Continued*

FRIDAY AFTERNOON, JUNE 19TH

Treatment of urinary infections
Dr. A. W. Hunter, Vancouver.

Management of vesical neck obstruction
Dr. N. E. Berry, Kingston.

Further results in uretero-intestinal anastomosis
Dr. R. A. McComb, Toronto.

Renal tuberculosis, presentation of two interesting cases
Dr. Gordon Ellis, Edmonton.

TRANSPORTATION AND HOUSING

Identification certificates may be obtained from the office of the General Secretary, 184 College Street, Toronto. These certificates entitle the purchaser to round-trip fare at one and one-third of the adult normal one-way first class or coach fare, plus 25 cents. Tickets are good going and returning via same route, or going via one authorized route and returning via any other authorized route. Return limit, thirty days in addition to date of sale. Passengers must reach original starting point not later than midnight of final return limit. Dates of sale:

From Ontario (Port Arthur, Armstrong and West) Manitoba, Saskatchewan, Alberta and British Columbia, June 9th to 17th, inclusive, 1942.

From Ontario (east of Port Arthur and Armstrong) Quebec, New Brunswick, Nova Scotia and Prince Edward Island, June 6th to 15th, inclusive, 1942.

Advice has been received that the Government has found it necessary, in harmony with its conservation policy with regard to gasoline and tires, to prohibit sight-seeing drives and motor service this coming summer. This means that there will be no sight seeing drives in Jasper park, nor motor service between Jasper and Lake Louise via the Columbia Icefield. Motor service, however, will be available between Jasper station and Jasper Park Lodge.

For double rooms equipped with either private tub or shower bath—$16.00 a day or $8.00 per person.

For double rooms without private bath or shower—$12.00 a day or $6.00 per person.

All double rooms are equipped with twin beds. In order to accommodate the entire party at the Lodge, it will be necessary for most of the delegates to go two to a room.

The Lodge is operated on the American Plan; the rates include meals.

The published schedule of rates (see *Journal* March, 1942, page 281) which includes first class railway fare to Jasper and return, standard lower berth as indicated, and four days' room and board at Jasper Park Lodge, includes $24.00 which is the minimum rate of $6.00 a day per person for four full days (*viz.*, arriving at midday Tuesday, with departure at midday on Saturday). This rate is only applicable to rooms without private bath or shower. For rooms equipped with private bath or shower the rate, as noted above, is $8.00 a day per person.

GOLF

The Golf Tournament will be held on Tuesday, June 16th, commencing at 9.00 a.m. and will continue throughout the day. In addition to the Ontario Cup, other special prizes are being provided. Special green fees to registrants at the convention, $1.50 per day.

DRESS — INFORMAL

All functions of the convention are to be strictly informal. You do not need to bring evening dress or dinner jackets.

JASPER NATIONAL PARK

Spacious, Colourful Conservation Area in the Rocky Mountains

Jasper is a name suggesting colour. It is the given name of the largest national park in North America—Jasper National Park, an irregular parallelogram of 4,200 square miles in Alberta on the eastern slope of the Rocky Mountains. The Park offers to the thousands who annually visit its many beauty spots a wealth of colour and variety. Visitors speak of the magic, the grandeur and stress the colour of Jasper.

Courtesy Canadian National Railways

BUNGALOWS, JASPER PARK LODGE

Nature has indeed been lavish with a generous palette of pigments ranging from the bright chalcedony of jasper to the dignified depths of jade. The lofty peaks in Jasper National Park are colourful, its lakes are crystalline jewels, their waters give highly coloured mental impressions because of glacial matter held in suspense; forests of pine, spruce and Douglas fir add darker tints; in mountain meadows blue forget-me-nots and larkspurs, golden arnicas, scarlet-tongued paint brushes, stately green and white zygadenes or the fragrant white heliotrope blend as a glorious mosaic. Even at 10,000 feet near glacier edges the snow-lily, moss campion or the magenta blossoms of the dwarf alpine willow-herb make a final stand of colour against the everlasting ice.

Mountains in Jasper National Park, a veritable sea of peaks, many of which lift their snow-caps more than 11,000 feet above sea-level, consist of a series of roughly parallel ranges running from the southeast to the northwest. The remarkable folds, upheavals and faults in the rock strata are visible everywhere in the park, as are the evidences of erosion caused mainly by the recession of glaciers which at one time filled the valleys.

Jasper National Park is historic ground. More stirring scenes in the upbuilding of Canada have been staged in it than in any other portion of the Rockies. Among those who have left the narrative of their experiences within its boundaries are David Thompson, the fur trader, and one of the greatest geographers of the world; Gabriel Franchere, Ross Cox and Alexander Ross, participants in John Jacob Astor's attempt to monopolize the fur-trade; David Douglas, the unwearied botanist who met an untimely death in the Sandwich Islands; Edward Ermatinger, the young trader; Pierre Jean De Smet, the ubiquitous Belgian missionary to the Indians; Sir James Hector, the explorer, most accurate of observers; Dr. Wm. Cheadle, first of the tourists; and Principal Grant, of Queen's University, seeking a route for a transcontinental railway.

Courtesy Alberta Travel Bureau

BIG HORN SHEEP ON MALIGNE CANYON ROAD, JASPER NATIONAL PARK

First set aside for public use in 1907 and its present boundaries fixed in 1914, Jasper National Park owes its name to Jasper House, a trading post established about 1813 by the North West Company on Athabaska River, and Jasper Hawse, a clerk. There is an intriguing story in this connection. The Indians called the region "Glittering Mountains". The white man gave it the one word "Jasper". Jasper Hawse was sent out to the mountains by the North West Company. He was an American who had drifted into the fur trade as a poorly-paid bookkeeper. But while explorers and others toiled over muskeg and fallen timber, climbed precipices, scaled mountains and forded icy streams to make history, Jasper simply stayed at home. In the end it was he after whom the Jasper area was named.

It was not until 1922, when the Canadian National Railways began construction of Jasper Park Lodge in the very heart of this great alpine park, that the outside world began to hear of and to appreciate its beauties. In the intervening years hundreds of thousands have visited Jasper and many more thousands have gazed upon its charms during the several hours it takes Canadian National's crack, fully air-conditioned Continental Limited, eastbound and westbound transcontinental trains, to cross from one of its limits to the other.

Since its opening, Jasper Park Lodge has grown from a modest group of tents and cabins to become the world's largest and most outstanding bungalow summer resort. It can accommodate more than 600 guests. Its 18-hole golf course has been ranked among the first ten in the world.

Courtesy Canadian National Railways

BEARS ON NO. 1 FAIRWAY, JASPER PARK GOLF COURSE

Great improvements have been made in the golf course in recent years. The most noticeable is the extension of all fairways right up to the foot of all greens. There is now no rough between any tee and any green. A fine velvety fairway exists over all distances in all cases, and it is necessary only to hit a ball straight to keep out of trouble, except on the tenth and fourteenth holes, where water hazards exist. A novel touch has been added at the tenth hole. At this hole there is a small pool of water about twenty-five yards in front of the tee. As this is fed by a small stream, the water is always pure. The Greens Keeper has stocked this pool with trout. As far as is known this is the only golf hole in the world that has

water on it stocked with game fish. Greens have been reseeded with a new type of bent grass, more like that found in the East.

Life at Jasper Park Lodge is varied. The visitor may desire activity and for such the program is complete. If the urge be for climbing, then indeed are the opportunities many. Within the confines of the Park are a score of unclimbed peaks, several of them yet unnamed, and for the successful optimist there is offered the glory of a mountain to carry his name to posterity. Lesser hills there are for the not so ambitious, tests for novice and veteran.

Courtesy Canadian National Railways

PUNCHBOWL FALLS, JASPER NATIONAL PARK

Tight lines and happy landings! That's a toast that anglers realize in Jasper—for here is a plenitude of game fish — trout of various species, Eastern Brook, Dolly Varden and Rainbow—in waters particularly suited to them, cold glacial lakes and tumbling mountain streams. And between casts even the most ardent sportsman may pause to marvel at his surroundings, for no other region on the continent offers a more arresting combination of woods and water and lofty peaks.

The Maligne region is noted for the sport it offers. Here eastern brook (speckled) trout were planted a number of years ago, and now they are found in Maligne and nearby lakes and in the Maligne River where pools and white water alternate over its length of ten miles from the pool at the outlet of Maligne Lake to where it empties into Medicine Lake.

The designers of Jasper Park Lodge chose to stress the harmonious note. They had at their disposal the broad valley of the Athabaska. The site selected was on the shore of beautiful Lac Beauvert, whose clear waters mirror their surroundings. Here was designed and constructed a series of Alpine chalets, grouped about a single-storied main lodge. Blending the rustic and the artistic, building walls, beams and rafters of peeled and varnished logs, the builders accomplished something that is of the mountains, from its foundations of natural boulders to its highest rooftree. They completed an ensemble which never fails to evoke expressions of delight from those who visit Jasper Park Lodge. Within the main building, with its administrative quarters and public rooms, and in the surrounding guest lodges, they installed all the conveniences and provided all the comforts of the modern hotel. For Jasper Park Lodge is a modern hotel in all its appointments. It provides the vacationist with all of the services and niceties which he may desire.

Jasper Park is on the transcontinental line of the Canadian National Railways and convenient connections can be made through that line from all points in the United States. For those whose time is limited Trans-Canada Air Lines operates a transcontinental service through Canada which offers speedy transportation to Edmonton which is only seven hours by train from Jasper Park.

The General Secretary's Page

These are great days to be alive—not merely living but alive. True enough they are grim days filled with anxiety and suspense, defeats and victories, chaos and confusion — but they also are days which bring to every vigorous individual an opportunity to do something personally to assist decent humanity to triumph over cruel and evil beasts. Never before in all history has the issue been so clear or the challenge so compelling. Of course we all deplore the whole sad business with its destruction and hate and hell, but we are in it, and we must see it through to a successful conclusion.

I know of nothing finer to sensitize one's reactions to the joy of living than a trip across Canada. On February 24th I was in Halifax. On March 21st I arrived in Vancouver. Province by Province, city by city, it is indeed a privilege and a pleasure to be able to sit down with one's colleagues and to feel so perfectly at home. After twenty years of such fellowship I can assure you that each visit represents a reunion with old friends and an opportunity to make new ones. I wish it were possible for every member to have a similar experience. Not only would your appreciation of the grandeur and greatness of our country expand but you would get much happiness and satisfaction too in meeting everywhere in Canada the same fine type of doctor as constitutes your medical neighbourhood.

As I told you last month the two major problems under discussion were the war and health insurance. Just as in the East and in the Central Provinces, I found Western Canada fully conscious of the issues and ready to meet them.

Happily, while I was on the Prairies the Honourable Colonel Ralston, speaking in the House of Commons stated that there was need for 800 doctors to enlist for war service this year. This by the way is the first official appeal for doctors which has been made by our Government since the war began. You may be sure that Western Canada will join with all other parts of Canada in meeting this appeal successfully. Each Province has a well organized and active Military Advisory Committee. They are co-operating fully with the Central Committee and with the local principal medical officers of the fighting services. The machinery exists in our organization to render intelligent assistance in making the best possible use of our medical man power—both in the armed services and in civil life. The new Questionnaire Survey for War Purposes also came out while I was in the West and immediately the Provincial Advisory Committees took steps to urge the profession to complete and return them. (By the way, have you mailed your copy yet?)

Medical economics is not an academic subject in the Canadian West. A rural municipality in Saskatchewan hired a physician in 1914 and the Province now has one-third of its municipalities served by more than one hundred municipal physicians working on a salary contract basis.

Manitoba has a number of municipal physicians scattered about the Province and has had considerable experience with medical relief and a voluntary health insurance plan operating in Winnipeg.

Alberta with its travelling clinics, cancer treatment centres and a dormant Health Insurance Act is thoroughly familiar with the arguments for and against the inauguration of Health Insurance.

British Columbia has a Health Insurance Act on its statute books—inoperative—but only so because of the united opposition of the medical profession to an Act which they consider to be ill-conceived, incomplete, inadequate and actuarily indeterminate.

But I found all four Provinces ready to examine sympathetically and objectively any health insurance plan which could be regarded as sound from every point of view. And this would appear to be the attitude of Canadian medicine as a whole.

Important as they are, the war and health insurance had to some degree to recede into the background while I was in Edmonton. The reason — Our Seventy-third Annual Meeting which takes place at Jasper Park during the week of June 15, 1942.

By remote control of some 200 miles, but by no means so remote as to impair efficiency to any degree, the local committees in Edmonton have done a grand job in getting ready for the Convention. Our President-Elect, Dr. Archer, and myself met the Committees—some twelve in number—in a march past review of their plans and duties, and I am happy to say that the Edmonton doctors and their ladies acting on behalf of all our Alberta hosts have every detail worked out in a most satisfactory manner. Attractive all-inclusive travel and hotel rates were published in the March *Journal*. The program in which more than 100 scientific speakers will take part is practical, instructive and well balanced. Close upon 300 hotel reservations have already been received. I would suggest that you write the management, Jasper Park Lodge, now and be sure to state accommodation desired.

As I write, somewhere near Dauphin, Manitoba, March is going out like a lion. Trains on the main line from which we have detoured are said to be fighting snowdrifts fifteen feet high, but with luck I should be home in two days with 13,000 miles registered in my travel book for the first quarter of 1942.

Medical War Relief Fund

Additional subscriptions have been received from:—

Caduceus Club, Toronto	$100.00
Peterborough Medical Society	135.00
Sports Committee of the Toronto East Medical Association	27.00

Medical Societies

Association of Clinical Surgeons of Western Canada

This Society held a two-day session in Winnipeg on February 27th and 28th. Dr. O. S. Waugh presided and Dr. M. R. MacCharles was the secretary. Col. Edward Archibald was present and was made an honorary member. Among those present were Drs. Gillespie, Anderson, and Alexander, of Edmonton, Morley Young, of Lamont, Alexander, of Saskatoon, Alport, Moore and McRae, of Regina, Leask, of Moose Jaw, Bigelow and Cromarty, of Brandon.

Those taking part in the program were Drs. K. Trueman, G. S. Fahrni, J. D. Adamson, W. G. Bigelow, M. R. MacCharles, A. C. Abbott, W. A. McElmoyle, O. S. Waugh, E. S. James, A. Gibson, C. W. Burns, Lennox Bell and P. H. T. Thorlakson.

The Calgary Medical Society

Every other year, over a long period, the members of the Calgary Medical Society have been invited to hold a meeting at the Provincial Sanatorium, or at the Belcher Military Hospital, where an interesting program has been presented by members of the staff of either institution. This year it was our privilege to enjoy a meeting at the Belcher Hospital, where a symposium on peptic ulcer was provided, in which the following members of the staff took part: Drs. J. K. Mulloy, F. T. Campbell, W. S. Quint and E. G. Mason.

Dr. Mulloy discussed the medical aspects of duodenal ulcer and reviewed a series of 266 patients under treatment in this institution since September, 1939, when the present war began. He stated that duodenal ulcer is not confined to the Canadian Army. It is very prevalent in the British and in the German Army. There were more than 266 patients in the Belcher Hospital with this lesion, but many files had been sent to other military hospitals where such patients had been admitted, so were not included in this series. Most of the patients were in the age-group of 19 to 30 years. Six of them had a gastric ulcer, 5 a pyloric ulcer and 11, stoma ulcers following gastroenterostomy, prior to enlistment.

Roentgenographic examinations showed gross defects in 260 of the patients and in only six of the 266 was a diagnosis made in the absence of definite x-ray findings.

One hundred and thirty-five gave a definite history of duodenal ulcer prior to enlistment. These symptoms varied from heartburn to those which necessitated a gastroenterostomy. Dr. Mulloy was of the opinion that for certain reasons the number was larger than one hundred and thirty-five. Two-thirds of the 266 would be a more accurate estimate of those who had a definite history of ulceration prior to enlistment. Among the nervous symptoms, the most commonly noted were insomnia not associated with pain, wet hands, tremor of the hands. The word "jittery" could be used easily in summing up many of the nervous symptoms. Twenty-one of the series had acute perforations requiring emergency treatment. One patient was attested in the morning and had a perforated ulcer in the evening. There were no deaths in this group. Hæmorrhage occurred in 8 patients. None required a blood transfusion, and all responded well to plenty of nutritious food. One patient had a gastroenterostomy for stenosis of the duodenum and another a partial gastrectomy for stenosis of the stoma of a prior gastroenterostomy. Dr. Mulloy considers worry, fretting, bad eating habits are all conducive to definite ulcer formation in those who have an ulcer diathesis.

Dr. F. T. Campbell reviewed the series of patients who required operative treatment. Dr. W. S. Quint discussed some of the x-ray findings in the series and demonstrated these with radiographs. He emphasized the value of administering belladonna in ruling out duodenal spasm which might be causing pain simulating organic disease.

Dr. E. G. Mason, speaking from a neurologist's point of view, considers anxiety and worry prime factors in perpetuating ulcer symptoms. Where freedom from these depressing causes can be obtained much benefit results. Open air sports which take the patient away from dull routine are sometimes of great value to the patient with peptic ulcer.

A special meeting of the Calgary Medical Society was held on March 19, 1942. A large number of members responded to the call, to hear Dr. T. C. Routley, general secretary of the Canadian Medical Association.

His visit was in connection with the Dominion Health Insurance scheme and the need for medical men in the armed forces. He reviewed fully each question of the questionnaire sent on the Health Insurance scheme, several of which required elucidation. Much interest was shown by those present and many questions were asked and much light was thrown on this issue, which, if it comes to fruition, will affect every practising physician.

At the annual meeting of the Calgary Medical Society, held April 9, 1942, the following officers were elected for 1942-43: *President* — Dr. F. Pilcher; *Vice-president* — Dr. G. Townsend; *Secretary*—Dr. J. K. Mulloy; *Treasurer*—Dr. J. V. Follett; *Librarian* — Dr. R. R. Hughes; *Executive Committee*—Drs. A. B. Singleton, C. B. Wright and S. H. McLeod.

La société médicale des hôpitaux universitaires de Québec

Un séance de cette Société eut lieu à l'Hôpital du St-Sacrement vendredi le 20 février 1942. Suivent les résumés des presentations:

RAPETISSEMENT CICATRICIEL DE L'ESTOMAC À LA SUITE DE L'INGESTION D'UN LIQUIDE CORROSIF.— F. Trempe.

L'ingestion d'un liquide corrosif entre dans le cadre des causes intrinsèques des lésions traumatiques de l'estomac. La production d'une telle lésion est conditionnée par le degré de dilution du liquide empêchant le réveil du spasme œsophagien.

Un jeune homme de 27 ans, arrive à l'Hôpital du St-Sacrement, un mois et quelques jours après avoir bu, par mégarde, de l'acide nitrique dilué. Un transit digestif fait préalablement, à la Clinique Roy-Rousseau, a montré un rapetissement cicatriciel de l'estomac, donnant l'aspect typique d'une théière de porcelaine, avec sténose. Une fois la limite maxima de temporisation atteinte, nous décidons d'opérer.

Des difficultés opératoires surgissent parce que les parois de la petite poche supérieure stomacale sont très épaissies, œdématiées et friables; nous sommes donc amené à faire une gastrectomie modifiée pour le circonstance, c'est-à-dire, une espèce de Billroth dont les temps se trouvent intervertis. Les suites opératoires sont normales. L'examen histo-pathologique de la pièce enlevée indique qu'il s'agit d'une simple lésion cicatricielle. Le malade quitte l'Hôpital 35 jours après son opération.

Ce cas est intéressant à plusiers points de vue qui ont été soulignés au cours de la présentation: l'agent causal inusité de la lésion traumatique de l'estomac, la lésion en elle-même, le problème thérapeutique et même technique auquel il a donné lieu, enfin l'heureux résultat obtenu, ce qui, pour le malade, reste encore l'essentiel.

CANCER DU JÉJUNUM.—F. Trempe.

Le cancer du petit intestin, duodénum excepté, est une rareté; il revêt toujours l'aspect d'une petite tumeur en ficelle, avec occlusion intestinale progressive; la sténose ne se complète que tardivement à cause du contenu liquide du grêle.

C'est l'examen radiologique qui fait le diagnostic de l'obstacle, mais non de sa nature, en constatant la rétrodilatation parfois énorme avec stase gastro-duodéno-jéjunale.

Une femme de 49 ans est admise à l'Hôpital du St-Sacrement, dans le Service de Médecine, le 20 janvier 1941, avec la triade symptomatique: vomissements, constipation opiniâtre et amaigrissement. Un transit digestif montre un duodénum et un jéjunum excessivement dilatés; *5 heures plus tard*, stase stomacale importante; de plus, sous l'estomac, on décèle une seconde image de stase en cupule qui semble correspondre aux circonvolutions du jéjunum. *24 heures plus tard:* même image.

22 février 1941: la laparotomie exploratrice est faite; nous trouvons sur le jéjunum, à deux pieds de l'angle duodéno-jéjunal, une tumeur sténosante, dure, un peu végétante extérieurement, de la grosseur d'un jaune d'œuf; le mésentère est farci de ganglions. Nous faisons alors la résection de l'anse jéjunale portant la tumeur et une anastomose latéro-latérale. Les suites opératoires sont très simples, la malade se lève le 8e jour. L'examen histo-pathologique montre qu'il s'agit d'un épithélioma glandulaire.

Le 25 mars 1941, la malade quitte l'Hôpital, pesant 86 livres. Le 16 janvier 1942, nous apprenons par son médecin qu'elle est bien portante, son poids se maintenant aux environs de 120 livres.

Nous retrouvons donc en parfaite santé, un an après son opération, une femme qui était atteinte d'une lésion rare et ordinairement fatale: un cancer du jéjunum.

MÉNINGO-ENCÉPHALITE ET TUBERCULOSE. — R. Lemieux et H. Nadeau.

Les auteurs présentent l'observation de deux cas de méningo-encéphalite d'origine grippale dont l'un s'est compliqué, en fin d'évolution, d'une tuberculose pulmonaire et laryngée à évolution rapide.

Dans les deux cas, on retrouve tous les caractères de certaines formes nerveuses de la grippe: brusquerie de l'attaque, intensité des symptômes généraux et surtout des manifestations nerveuses: raideur de la nuque, signe de Kernig, abolition ou forte diminution des reflexes des membres supérieurs et inférieurs, anomalies du liquide céphalo-rachidien (présence de lymphocytes), évolution particulière, régression rapide et complète sous l'influence du traitement sulfamidé. Dans l'un des cas une tuberculose pulmonaire et laryngée évolua d'une façon ultra-rapide alors que le malade était en pleine convalescence de son infection grippale. L'examen radiologique des poumons révèle la présence d'une image en mie de pain des deux plages pulmonaires avec grande spélonque dans la région sous-claviculaire droite. Ce malade était donc porteur de B.K. depuis longtemps déjà. Cette tuberculose a évolué d'une façon foudroyante à la faveur d'un état de moindre résistance de l'organisme.

De tels fait imposent une surveillance constante des malades atteints d'une forme grave de la grippe, maladie qui compte parmi les plus débilitantes. On devra relever rapidement les forces de ces malades par tous les moyens, afin de mettre leur organisme en mesure de lutter contre l'apparition d'une complication aussi redoutable.

Correspondence

Blood Donors

To the Editor:

I feel that it is in the interest of the war effort for me to submit this letter offering my analysis of a vital problem and an obvious solution.

Several citizens, having been canvassed by circulars, have asked whether they could be used as blood donors.

The Medical Services of Canada have so far shown little evidence of either foresight or familiarity with many methods of blood transfusion that are in common practice in almost all of our hospitals and extensively reported in our medical journals. According to several of our lay periodicals many of them have been employed by allied and enemy forces since the beginning of this war.

I am astonished that the Medical Services have not been instructed to take advantage of the winter's lull in demand for blood (Hitler's excepted) and its allied preparations, after the

lessons of London's bombings. The largest group of donors, and the most vital group of blood collectors, have apparently been left idle; frantic appeals to the population have been substituted. There has apparently been a form of isolationist indifference, in this as well as several other fields of medical war endeavour, that is almost sure to leave us in the hands of those infamous generals of cartoon fame, depicted as responsible for many failures —"too little and too late".

Enumeration will accentuate these facts:

1. Every enlisted person is a potential blood recipient.
2. Every enlisted person is categorized and of the ideal age and in an ideal state of observation to be selected as a donor, except for Kahn, etc.
3. Every enlisted person should be considered as a potential donor.
4. The Medical Service of almost every unit may be, on no notice, called upon to administer blood, etc., to any of its personnel.
5. Incredibly, blood typing and tests for syphilis are omitted on enlistment and yet are essential for all donors, especially those of whole blood, still the simplest method for isolated emergencies.
6. "Banks" require continual replenishment, as the present methods of preserving blood and its derivatives require it to be used before an expiration date.
7. Every person during primary training in Canada by donating 500 c.c. every two or three months under conditions that so far have required almost no transfusions, would not only supply enough for all his own transfusions but for many others too. We do not anticipate 100 per cent transfusion incidence.
8. The Medical Departments need, if they are not crying for, the experience of preparing for wholesale transfusion and thus every enlisted man could become acquainted with the experience of donating.

I do not wish to have the present agency for collecting blood from patriotic citizens abolished but it seems like misdirected effort, and expense, to have a separate organization deprive the Medical Services of what should be extremely valuable work. Certainly we can use both, and let the citizen donors supplement the Services rather than bear the brunt. Our program should be flexible enough to permit blood being used for civilian casualties as well as service ones.

Literature and experience tell us that transfusion is the greatest weapon with which to combat hæmorrhage, and plasma to combat shock. Both if improperly prepared or used may cause sudden death. I therefore feel that we should become more widely familiarized with handling them. They mean life or death of any of us as well.

I can mention other faults of the existing medical organization but they are of little importance in comparison. I hope this avenue will permit my words to reach responsive ears. Conversations with physicians here and elsewhere, with doctors and even engineers in the Army, Navy, and Air Force reveal a state of mental futility, hopelessness, and almost despair; a feeling that all protest is useless due to lack of a vehicle for constructive or destructive criticism.

The Canadian Medical Association should be an effective vehicle.

J. A. WEBSTER.

Yarmouth, N.S.,
March 23, 1942.

Special Correspondence

The London Letter

(From our own correspondent)

Wartime health.—A delicate index of the state of the "home front" is undoubtedly to be found in a study of official health returns, mention of some of which has already been made in previous contributions. This month it is possible to summarize certain further reports which taken as a whole reveal a most satisfactory state. Most cheerful of all—although on a small scale —is the report by the chief medical officer of the post office that from examination of sixteen-year old entrants, boys and girls in 1941 as compared with 1938 the girls, in spite of war conditions were on an average as tall and weighed as much as their peace-time predecessors, whereas the boys showed that the wartime contingent were about one inch taller and 2½ pounds heavier than the 1938 group. Most of these adolescents had been in London all through the war, had been through the air-raids and were of course subject to the common rationing of food-stuffs.

Covering a much larger field are the figures for the country as a whole published by the Registrar-General—not the annual stocktaking which is, alas! suspended, but quarterly returns —and it is possible now to see the effects of the two years of hostilities. If the deaths due to bombing are deducted (40,000 a year—not so many as were expected!) the general mortality rates are satisfactory. Both years had severe winters, which alone would have raised the death rate from respiratory disorders, even without the extra strains imposed by shelter life and black-out ventilation. Infant mortality shows a significant but slight rise, a warning that, despite the justifiably optimistic outlook for health as a whole, extra care is necessary and vigilance cannot be relaxed. Suicides have declined great-

ly, especially among women, a curious effect of war noted before. The tuberculosis death rates are the most disquieting. The medical statistician of the registrar-general's office calculates that the mortality rates for respiratory tuberculosis increased by 6 per cent in the first year of war and by 10 per cent in the second year. This is such an important problem that it must be discussed in a paragraph of its own.

Tuberculosis—preventive measures.—The National Association for the Prevention of Tuberculosis has issued a valuable memorandum stating in effect that the secret of prevention is early diagnosis, and early diagnosis means radiographic methods. Mass radiography on miniature films has already been adopted by the Royal Navy and it is of importance to note that the Trades Union Congress passed a resolution in 1941 urging x-ray examination of the lungs within a year of entry into industry of all young entrants, followed by repeated examinations up to the age of 18 years. It is a matter of doubt if skilled radiologists and the necessary apparatus are available at present but as regards the latter the N.A.P.T.'s memorandum states that "there is reason to believe that the x-ray manufacturers will shortly be ready to provide apparatus as soon as they receive orders".

A small scale application of this type of investigation has recently been provided in Wales by an examination of adolescent boys seeking admission to the Air Training Corps. Careful comparison of full-size and miniature films showed that the latter did not miss anything of importance. It promises to be a useful and relatively cheap method of detecting pre-symptomatic pulmonary disease. Two out of 437 adolescent boys in the Welsh series had active disease, 9 were noted as needing further observation.

Another method, recently reported for two factories, has been the use of mass radioscopy. In one factory 60 per cent and in the other 97 per cent volunteered for examination by this means and the result was the detection of 3 cases of active disease out of 575 in one factory and 4 out of 795 in the other.

All these figures are small, but the point is that without some such radioscopic or miniature film method these patients would have been "missed", spreading their disease to others and prejudicing their own chances of cure. But radioscopy presents dangers for the radiologist and miniature radiography seems the method of choice. It is good that the urge is coming from the workers themselves through the Trades Unions, and safeguards as regards victimization and so forth will naturally be employed. The wartime increase in tuberculosis is likely to yield to better preventive measures.

Nurseries for war workers' children.—Another useful by-product of the war is the greatly increased demand for day nurseries where children can be safely left while the valuable services of young married women in industry are utilized. There are probably about 1,000 war-time nurseries now in action or shortly to be available. The London County Council plans to set up and operate 50 day nurseries in suitable rest centres for children between the ages of two and five years. Criticisms point out the dangers of herding pre-school age children together in day nurseries but against this are the great opportunities afforded for preventive measures. For example, the wholesale application of immunization against diphtheria and the preventive inoculation of whooping-cough vaccines becomes practical policy.

Another criticism speaks of the relatively large number of women required to supervise these nurseries if safety is to be maintained. But an answer to this is found in Kensington where relays of the young personnel from first-aid posts work at the nurseries, supplying the necessary supervision while undergoing training which, always valuable, will provide a lot of better trained mothers in the future.

Finally the medical authorities may be somewhat mixed at present but there is a chance that the war-time nursery scheme may lead to a better co-ordination of all those concerned with the medical supervision of the child from birth until the end of the school period. At present this is divided between the Ministry of Health and the Board of Education—through the corresponding local authorities. Nurseries—day, wartime or residential—raise acutely the problem of which authority is in charge of medical arrangements.

The Churchill Hospital.—A group of American surgeons have been working over here for 18 months and now they have a home of their own in the newly-opened Churchill Hospital, a building adjacent to the Wingfield-Morris Orthopædic Hospital at Oxford. The Duchess of Kent opened the hospital the other day which will provide 600 beds, two-thirds orthopædic. Thus under the twin flags of America and Great Britain will work a staff of about 12 doctors, including Dr. Rogers, of McGill, for general surgery, and about 50 American and Canadian nurses. Professor Philip D. Wilson, of New York, is the leader of this further evidence of cultural and scientific fellowship between the English-speaking nations.

ALAN MONCRIEFF.

London, March, 1942.

This only grant me, that my means may be
Too low for envy, for contempt too high.
Some honours, I would have,
Not from great deeds, but good alone.
The unknown are better than ill known,
Rumours can ope the grave;
Acquaintance I would have, but when 't depends
Not on the number, but the choice of friends.

(Abraham Cowley).

The War

Nominal Roll of Medical Officers Royal Canadian Air Force*

The list of those serving in the Army has appeared in the February issue; that of the Navy is expected to follow.—(ED.).

Group Captains

Hunter, J. E.	Ottawa, Ont.
Tice, J. W.	Hamilton, Ont.

Wing Commanders

Barr, M. L.	London, Ont.
Chalk, S. G.	Kingston, Ont.
Cheesman, F. J.	Saint John, N.B.
Corbet, A. A. G.	Saint John, N.B.
Day, E. E.	Vancouver, B.C.
Dowd, K. E.	Montreal, Que.
Emard, J. M. L.	Montreal, Que.
Growse, J. M.	London, Ont.
Hall, G. E.	Weston, Ont.
Kelly, A. D.	Toronto, Ont.
Leggett, L. H.	Guelph, Ont.
Mathewson, F. A. L.	Winnipeg, Man.
Mitchell, H. D.	Ottawa, Ont.
Noble, E. C.	Toronto, Ont.
Peacock, H. A.	Hamilton, Ont.
Rankin, W. D.	Halifax, N.S.
Sifton, J. A.	Toronto, Ont.
Stone, A. C.	Montreal, Que.
Tilley, A. R.	Toronto, Ont.
Tisdall, F. F. G.	Toronto, Ont.

Squadron Leaders

Badger, G. A.	Vancouver, B.C.
Baxter, R. G.	Regina, Sask.
Brewster, W. R.	New Westminster, B.C.
Brown, W. F.	St. Marys, Ont.
Buck, C. A.	Toronto, Ont.
Burt, C. F.	Alliston, Ont.
Campbell, E. O.	Toronto, Ont.
Coleman, H. M.	Toronto, Ont.
Cork, J. F.	Toronto, Ont.
Cranfield, H. V.	Toronto, Ont.
Cruikshank, J. M.	Nassau, Bahamas, B.W.I.
Douglas, G. R.	New Glasgow, N.S.
Easton, D. R.	Stratford, Ont.
Elder, G. G.	Medicine Hat, Alta.
Ferguson, J. K. W.	Toronto, Ont.
Fergusson, E. A.	Weymouth, N.S.
Finlayson, W.	Vancouver, B.C.
Franks, W. R.	Toronto, Ont.
Gamble, J. E. D.	Brantford, Ont.
Goddard, J. C.	Leduc, Alta.
Hanna, H. E.	Ottawa, Ont.
Helliwell, M. R.	Kincardine, Ont.
Hession, B. L.	Camp Borden, Ont.
Hiltz, J. W.	Cobourg, Ont.
Hubbs, D. H.	Toronto, Ont.
Jackson, R. A.	Hamilton, Ont.
Jay, H. J. D.	London, Ont.
Kemp, W. N.	Vancouver, B.C.
Kreiner, J. H.	Kitchener, Ont.
Lawson, R. N.	London, Ont.
Marshal, W. D.	Guelph, Ont.
Meakins, J. F.	Montreal, Que.
Moffatt, J. B. P.	Toronto, Ont.
Montgomery, R. C. P.	Toronto, Ont.
MacLean, M. S.	Welland, Ont.
MacLachlan, I. K.	Toronto, Ont.
Oborne, H. G.	Toronto, Ont.
O'Connell, J. J.	Newboro, Ont.
Running, K. H.	Smith's Falls, Ont.
Sellers, A. H.	Toronto, Ont.

Squadron Leaders

Sharpe, J. E.	Toronto, Ont.
Sinclair, J. D.	Toronto, Ont.
Smith, H. G.	Ottawa, Ont.
Stewart, C. B.	Noroboro, P.E.I.
Weber, W. H.	Toronto, Ont.
Westcott, D. B.	Collingwood, Ont.
Whaley, J. B.	Toronto, Ont.
Whyte, J. C.	Mossbank, Sask.
Williams, M. D.	Port Burwell, Ont.
Wilson, C. T.	Iroquois Falls, Ont.

Flight Lieutenants

Adams, J. W.	Toronto, Ont.
Adamson, G. L.	Winnipeg, Man.
Aiken, J. B.	Fisherville, Ont.
Allen, C. S.	Winnipeg, Man.
Allen, J. R. A.	Glack's Harbour, N.B.
Anderson, G. L. St.C.	Sarnia, Ont.
Armit, J. C.	Weyburn, Sask.
Armstrong, J. C.	Ottawa, Ont.
Arthur, J. F.	Redvers, Sask.
Attridge, F. R.	Winnipeg, Man.
Avery, J. F. G.	North Battleford, Sask.
Baillie, J. H.	Toronto, Ont.
Barker, C. S.	Montreal, Que.
Barry, J. J.	Prescott, Ont.
Barton, F. C.	Toronto, Ont.
Bell, E. G.	Toronto, Ont.
Bellan, S.	Winnipeg, Man.
Belton, J. H.	Sarnia, Ont.
Bicum, G.	Elstow, Sask.
Birrell, J. D.	Toronto, Ont.
Black, G. A.	Aylmer, Ont.
Blair, A. C.	Moose Jaw, Sask.
Blair, W. E.	Saskatoon, Sask.
Boyd, C. G.	Guelph, Ont.
Boyd, W. J.	Roland, Man.
Boyle, E. S.	Sanmour, Que.
Boyle, W. G.	Port Frances, Ont.
Bradley, G. C.	Regina, Sask.
Bradley, L. O.	Regina, Sask.
Braiden, R. S.	Weston, Ont.
Brault, J. I. R.	Quebec, Que.
Brien, W. P.	Windsor, Ont.
Brillinger, H. R.	Hamilton, Ont.
Brown, B. R.	Toronto, Ont.
Brown, C. B.	Humber Bay, Ont.
Bruser, D. M.	Weyburn, Sask.
Buchanan, C. A.	London, Ont.
Buntain, J. H.	Moncton, N.B.
Burnett, R. R.	Durham, Ont.
Button, F. J.	Stouffville, Ont.
Cadham, R. G.	Winnipeg, Man.
Caldbick, G. D.	Haileybury, Ont.
Calvert, K. G.	Strathroy, Ont.
Cameron, A. A.	Rainy River, Ont.
Campbell, I.	Mogadore, Ohio, U.S.A.
Caughey, G. C.	Ottawa, Ont.
Cawker, C. A. M.	Medicine Hat, Alta.
Cowie, G. A.	Kirkland Lake, Ont.
Christie, D.	Elfros, Sask.
Christie, H. R.	Rossland, B.C.
Church, C. B. G.	Perth, Ont.
Clare, R. M.	Edmonton, Alta.
Cleghorn, I. M.	Winnipeg, Man.
Cohen, A.	Winnipeg, Man.
Cohen, E.	Edmonton, Alta.
Coles, B. C.	Virginiatown, Ont.
Colquhoun, J. D.	Seaforth, Ont.
Crisp, A. G.	Toronto, Ont.
Crossland, A. M.	Barrie, Ont.
Currier, T. E.	Ottawa, Ont.
d'Easum, L. G. C.	New Westminster, B.C.
Demers, M. J. E. C.	Quebec, Que.
Dillane, J. E.	Schomberg, Ont.
Dick, R. N.	Chemainus, B.C.
Doney, E. H.	Toronto, Ont.
Donohue, W. L.	Toronto, Ont.
Dooley, R. J.	Ottawa, Ont.
Doyle, H. S.	Toronto, Ont.

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Flight Lieutenants

Doyle, P. E.	Souris, P.E.I.
Duncan, B. P.	Regina, Sask.
Dupuis, J. G. R. Y.	Quebec, Que.
Eaglesham, F. C.	Weyburn, Sask.
Elias, J. C.	Carman, Man.
Ellenzweig, M. S.	Hamilton, Ont.
Elliot, A. J.	New Westminster, B.C.
Emery, G. H.	Chatham, Ont.
Emmett, J. C.	Weston, Ont.
Evelyn, K. A.	Montreal, Que.
Feller, J.	Ottawa, Ont.
Fenton, M. J.	London, Eng.
Firth, J. D. A.	Toronto, Ont.
Forsyth, C. W.	Viceroy, Sask.
Foster, N. E.	Abernethy, Sask.
Francis, J. R.	Calgary, Alta.
Fraser, A. M.	Scotsburn, N.S.
Freed, B. D.	Carlisle, Ont.
Garand, N. D.	Toronto, Ont.
Gates, R. T.	Sarnia, Ont.
Gibson, J. E.	Kingston, Ont.
Goluboff, N.	Rosthern, Sask.
Gordon, N. S.	Ottawa, Ont.
Graham, D. C.	Brampton, Ont.
Graham, G. H.	Fairville, N.B.
Graham, R. T. G.	Stoney Creek, Ont.
Grant, D. M.	Eureka, N.S.
Gray, R. C. V.	Kingston, Ont.
Green, J. W.	Dundas, P.E.I.
Green, P. T.	Toronto, Ont.
Hagan, J. N.	Toronto, Ont.
Hall, A. S.	Edmonton, Alta.
Hall, C. W.	Winnipeg, Man.
Hall, G. R.	Toronto, Ont.
Hall, W. E.	Kingston, Ont.
Hargróve, W. A.	Milestone, Sask.
Harold, T. C.	Ladysmith, B.C.
Harris, R. S.	Toronto, Ont.
Harvie, F. H.	Toronto, Ont.
Heard, S.	London, Ont.
Hersey, M. L. R.	Montreal, Que.
Hicks, M. W.	Picton, Ont.
Hill, P. D. A.	Toronto, Ont.
Hoffman, O.	Brantford, Ont.
Hogg, J. H. S.	Preston, Ont.
Holmes, S. J.	Toronto, Ont.
Hopkirk, J. F.	Halifax, N.S.
Houze, M.	Brockville, Ont.
Howell, P. T. W.	Guelph, Ont.
Howlett, J. G.	Montreal, Que.
Hudson, A. L.	Toronto, Ont.
Hutchison, H. M.	MacLeod, Alta.
Hutton, D. V.	Toronto, Ont.
Irwin, J. K. L.	Halifax, N.S.
Israels, S.	Nut Mountain, Sask.
Janes, J. M.	Rochester, Man.
Jeffs, J. I.	Hamilton, Ont.
Jenkins, J. G.	Kingston, Ont.
Jenner, L. C.	Blenheim, Ont.
Johnston, J. G.	Trenton, Ont.
Johnston, J. C.	Regina, Sask.
Joncas, H. J. F.	Montreal, Que.
Kane, L. A.	Toronto, Ont.
Kark, R. M.	Brookline, Mass., U.S.A.
Kelly, H. G.	Kingston, Ont.
Kennedy, R.	Alberton, P.E.I.
Kenyon, J. M.	Brantford, Ont.
Kerr, W. K.	Toronto, Ont.
Kerwin, A. J.	Toronto, Ont.
Kester, H. A.	London, Ont.
Kinsey, P.	Toronto, Ont.
Kirk, T. E.	St. Albans, Vermont, U.S.
Kirschberg, L. S. S.	Westmount, Que.
Knowling, T. A.	St. Johns, Newfoundland
Kyle, C. A.	Toronto, Ont.
Lapin, A. W.	Montreal, Que.
Large, A. W.	Toronto, Ont.
Latchford, J.	Toronto, Ont.
Laws, H. W.	Westmount, Que.
Lawson, G. A.	Shoal Lake, Man.

Flight Lieutenants

Lecavalier, E. M. J. U.	Montreal, Que.
Leckie, G. G.	Lucky Lake, Sask.
Lee, C. C.	Langton, Ont.
Lees, J. M. N.	Vancouver, B.C.
Leonard, J. C. A.	Montreal, Que.
Lindsay, E. J. A.	Noranda, Que.
Lindsey, G. W.	Brighton, Ont.
Livesay, R.	Toronto, Ont.
Lowenstein, L.	Montreal, Que.
Lund, P. C.	Cold Lake, Alta.
Lundy, F. E.	Winnipeg, Man.
Macaulay, M. G.	Calgary, Alta.
Mahoney, J. A.	Kenora, Ont.
Male, R. W.	Tottenham, Ont.
Manace, Gordon	Toronto, Ont.
Manning, G. W.	Toronto, Ont.
Marquis, J. A. D.	Brantford, Ont.
Mather, J. M.	Toronto, Ont.
Mathews, R. M.	Port Arthur, Ont.
Mellow, R. C.	New Toronto, Ont.
Metzler, W. St.G.	Toronto, Ont.
Milne, D. H.	Cargill, Ont.
Minnes, H. E.	Ottawa, Ont.
Minnes, J. F.	Ottawa, Ont.
Mitchell, W. B.	Collingwood, Ont.
Montreuil, L. F. P. M.	Montreal, Que.
Moore, A. H.	Mattawa, Ont.
Morrow, B. M.	Toronto, Ont.
Morton, J. E. C.	Waterford, Ont.
Munroe, D. S.	Vancouver, B.C.
MacCallum, R. J.	London, Ont.
MacDonald, D. C.	Ceylon, Sask.
MacDonald, J. D. C.	Ingersoll, Ont.
MacKay, I. E.	Stellarton, N.S.
MacLennan, I. A.	Campbellton, N.B.
MacLeod, F. H.	Port Hawkesbury, N.S.
MacPhee, A. C.	Alexandria, Ont.
McAllister, J. E.	Edmonton, Alta.
McAlpine, H. T.	London, Ont.
McClintock, H. T.	Brownsville, Ont.
McDonald, D. W.	Outremont, Que.
McGregor, H. B.	Penticton, B.C.
McGugan, R. G.	London, Ont.
McIntyre, D. N. C.	Winnipeg, Man.
McIntyre, H. R.	Moose Jaw, Sask.
McIntyre, J. A.	Lanark, Ont.
McKay, W. G.	Oshawa, Ont.
McKenty, J. S.	Winnipeg, Man.
McLean, J. A.	Merlin, Ont.
McLean, P. M.	Chemainus, B.C.
McManus, F. R.	Kenora, Ont.
McPhail, J. E. B.	Toronto, Ont.
Nash, L. T. W.	Vancouver, B.C.
Navin, S. J.	Harbour Island, Bahamas, B.W.I.
Nelson, D. G. M.	Guelph, Ont.
Nicholls, J. V. V.	Montreal, Que.
Nodwell, G. R.	Ottawa, Ont.
North, H. W. C.	Carman, Man.
O'Neill, J. C.	River Hebert, N.S.
Ogryzlo, M. A.	Winnipegosis, Man.
Orr, W. L.	Montreal, Que.
Palmer, J. G.	Toronto, Ont.
Pashby, T. J.	Leaside (Toronto), Ont.
Park, R. J. G.	Swift Current, Sask.
Parnell, J. L.	Victoria, B.C.
Paterson, A.	San Leandro, Calif., U.S.
Pattee, C. J.	Montreal, Que.
Patterson, F. P.	Toronto, Ont.
Payette, J. M. H.	Montreal, Que.
Peart, J. A.	Toronto, Ont.
Peloquin, G. E. C.	Victoriaville, Que.
Penney, G. R.	Toronto, Ont.
Pepper, W. V.	New Westminster, B.C.
Perley, D. A.	Sidney, V.I., B.C.
Perverseff, J. J.	Krydor, Sask.
Piche, J. G. M. D.	Montreal, Que.
Porter, J. J.	Calgary, Alta.
Prieur, O. G.	Calgary, Alta.
Racicot, L. H.	Farnham, Que.

Flight Lieutenants

Reid, W. J.	Chatham, Ont.
Riddell, A.	Brantford, Ont.
Riddell, W. G.	Beausejour, Man.
Riley, H. W.	Fort Garry, Winnipeg, Man.
Ripstein, C. B.	Montreal, Que.
Robertson, R.	Muskoka Hospital, Gravenhurst, Ont.
Rolland, R. E. L.	Montreal, Que.
Rose, A.	Toronto, Ont.
Ross, H. M.	Vancouver, B.C.
Ryall, D. B.	Victoria, B.C.
Ryan, E. J.	Crystal Beach, Ont.
Ryberg, P. E.	Buenos Aires, Argentina
Savage, H. L.	Toronto, Ont.
Sedlezky, I.	Montreal, Que.
Setterington, M. J.	Harrow, Ont.
Sheard, C.	Toronto, Ont.
Sims, H. A.	Barrie, Ont.
Smith, G. L.	Theodore, Sask.
Smith, R. C.	Toronto, Ont.
Spaner, S.	Edmonton, Alta.
Sparling, S. C.	Toronto, Ont.
Sprague, G. H.	Edmonton, Alta.
Steiman, I.	Kamsack, Sask.
Stewart, J. T. R.	Toronto, Ont.
Stewart, N. A.	Vancouver, B.C.
Stogdill, C. G.	Toronto, Ont.
Storey, R. N.	Collingwood, Ont.
Sturgeon, L. W. C.	Meaford, Ont.
Sutton, G. L.	Montreal, Que.
Sweet, T. A.	Toronto, Ont.
Tauer, C.	Outremont, Que.
Taylor, C. W.	Toronto, Ont.
Taylor, R. G.	Toronto, Ont.
Temple, G. D.	Toronto, Ont.
Teviotdale, J. R. J.	Pasadena, Calif., U.S.A.
Thompson, L. W.	Toronto, Ont.
Thomson, F. B.	St. Catharines, Ont.
Townsend, M. L. G.	Montreal, Que.
Trimble, G. X.	Lawton, Okla., U.S.A.
Turner, J. G.	Fredericton, N.B.
Underhill, A. S.	Kelowna, B.C.
Vezina, J. R. A.	Quebec, Que.
Vigeant, J. H. E.	Montreal, Que.
Waddell, J. M.	Edmonton, Alta.
Wall, M. D.	Winnipeg, Man.
Wallace, J. D.	Wainwright, Alta.
Warner, H. M.	Ottawa, Ont.
Warren, C. M.	Toronto, Ont.
Warwick, O. H.	Westfield Centre, Kings County, N.B.
Watson, W. A. C.	Granby, Que.
Watters, W. N.	London, Ont.
Webb, E.	Stratford, Ont.
Webb, G. A. C.	Drumbo, Ont.
Weddell, J. A.	Peterborough, Ont.
West, W. T.	Toronto, Ont.
Westman, E. R.	Toronto, Ont.
Whillans, M. G.	London, Ont.
White, J. T.	Fort William, Ont.
Williams, A. D.	Fort Erie, Ont.
Williams, L. J.	Toronto, Ont.
Williams, M. F.	Toronto, Ont.
Wilson, C. G.	Port Arthur, Ont.
Wilson, C. S.	Kitchener, Ont.
Wilson, D. R.	Edmonton, Alta.
Wilson, H. E.	Ship Harbour, N.S.
Wilson, W. J.	Richmond Hill, Ont.
Young, A. E.	Toronto, Ont.
Young, C.	Edmonton, Alta.

Flying Officers

Aeberli, E. W.	Toronto, Ont.
Allen, D. R.	Chesley, Ont.
Amodeo, W.	Kingston, Ont.
Atkinson, W. H.	South Porcupine, Ont.
Belanger, L. F.	St. Laurent, Que.
Black, T. H.	Toronto, Ont.
Bochner, A. A. K.	Toronto, Ont.

Flying Officers

Brown, N. M.	Montreal, Que.
Cameron, W. J. M.	St. Thomas, Que.
Charbonneau, J. A. R.	Verdun, Que.
Clark, J. R.	Peterborough, Ont.
Cowan, R. J.	Toronto, Ont.
Daniel, E.	Rivers, Man.
Dufresne, J. M. A.	Matachewan, Ont.
Gibson, L. M.	Kingston, Ont.
Goldstein, P.	Prince Albert, Sask.
Guest, W. C.	Winnipeg, Man.
Hughes, H. V.	
Hutchison, J. H.	Wilkie, Sask.
Jones, A. F.	Montreal, Que.
Katz, E.	Montreal, Que.
Kingsley, D. J.	Marysville, N.B.
Magid, L. G.	Esterhazy, Sask.
Meyer, E. G.	Toronto, Ont.
Mills, W. C. B.	
Moorhouse, C.	Brockville, Ont.
MacArthur, W. J. C.	Toronto, Ont.
McPhail, W. D.	Saskatoon, Sask.
Newstone, J. M.	Fenwood, Sask.
Norris, C. K.	Waterloo, Que.
Ormsby, H. L.	Toronto, Ont.
Preston, F. C.	Toronto, Ont.
Rose, B.	Montreal, Que.
Rothwell, G. S.	West Vancouver, B.C.
St. Onge, L. C. A.	Huntingdon, Que.
Theoret, J. R.	Beauharnois, Que.
Thompson, J. L.	Saint John, N.B.
Thorne, E. L.	Halifax, N.S.
Todd, J. E.	Barrie, Ont.
Vanderburgh, A. W.	West Somerland, B.C.
Webster, W. G.	
Wilson, J. W. E.	New Westminster, B.C.

Third Canadian Division Medical Society

The Medical Society of the 3rd Canadian Division was organized before the Division proceeded overseas. While in Canada no action was taken to have this Society officially affiliated with the Canadian Medical Association. Since arrival overseas, it is the desire of this Society to be officially represented with its parent Society.

The following is a résumé of the activities of our Society since its organization in Canada in November, 1940.

The Society was sponsored by Colonel L. H. Leeson, E.D., A.D.M.S. 3rd Canadian Division and at its inaugural meeting the following officers were elected:

President.—Lt.-Col. E. F. Ross, 22nd Field Ambulance.
Vice-president.—Major J. Howard, 23rd Field Ambulance.
Secretary-Treasurer.—Capt. G. C. Large, R.C.A.M.C.

The Society met every two weeks at Debert Military Camp, N.S., and the following officers presented papers:

Major J. A. Noble, R.C.A.M.C., "The soldier's foot".
Major H. C. S. Elliot, R.C.A.M.C., "Medical boards".
Major H. M. Logan, R.C.A.M.C., "Hygiene and sanitation in the army".
Major Fletcher, R.C.A.S.C., "Travel in Africa".
Major T. Brown, R.C.A.M.C., D.A.D.M.S. 3rd Canadian Division, "Experience in England with 2nd Canadian Division".
Capt. Gibson, G.S.O. (C.W.), "Gas warfare".
Lt.-Col. C. E. Kinley, R.C.A.M.C., "Surgical conditions of the spine applicable to the army".

A symposium on tropical diseases was also presented by the following Divisional Medical Officers, Major J. Howard, Major H. M. Logan and Capt. J. F. Nicholson.

The organization of this Society marked an important event of the army life of the doctors within the Division and its meetings have been utilized freely by them to settle the many medical problems that arise in their daily work.

In November, 1941, after arrival in England and when all units were settled, the annual meeting was held in the officers' mess, No. 22 Canadian Field Ambulance, and election of officers for the ensuing year was held with the following slate being approved:

President.—Lt.-Col. G. A. Lyons, 14th Field Ambulance.

Vice-president.—Major J. A. Noble, 22nd Field Ambulance.

Secretary-Treasurer.—Capt. J. A. Wright.

The first overseas dinner of the Medical Society took place at the Roebuck Hotel, Wych Cross, Sussex, on February 11, 1942: 13 guests and 34 members of this Society attended. Amongst guests present were Major-General C. B. Price, D.S.O., D.C.M., V.D., G.O.C., 3rd Canadian Division, Brigadier E. W. Haldenby, M.C., V.D., Brigadier J. A. Linton, M.C., D.D.M.S., Canadian Corps, Colonel C. P. Fenwick, M.C., A.D.M.S., 2nd Canadian Division, and representatives of the Medical Societies of 1st and 2nd Canadian Divisions and Canadian Corps Troops.

Following the dinner a very interesting address, entitled "Blitzkrieg" was given by Brigadier M. Cowell, C.B., C.B.E., D.S.O., T.D., D.L., M.D., F.R.C.S., D.D.M.S., 2 Corps, outlining the now classical method of "*Schwerpunkt und Aufrollen*" and the usual method of defence.

It was emphasized the need for a medical officer to be fully familiar with all parts of a modern army, its organization and methods of operation, so as to be able to render the most efficient service. Details of the proposed changes in the organization of the medical services in the field were outlined, particularly with regard to Field Ambulances and the C.C.Ss. Major-General C. B. Price, D.S.O., D.C.M., V.D., opened the discussion. He stressed the importance of the medical services in modern warfare, particularly with regard to the troops' morale; the knowledge that should he become a casualty he would receive early and adequate care, was a big factor in maintaining the soldier's fighting spirit.

The discussion ended with an appreciation by Colonel L. H. Leeson, A.D.M.S., of Brigadier Cowell's address and helpful response to the many questions.

It is respectfully requested that your Council consider the application of the 3rd Canadian Division Medical Society for affiliation with the Canadian Medical Association.

S. G. SHIER, MAJOR,
For Secretary, 3rd Canadian Division Medical Society.

Acceleration of Medical Training

(Statement by the Minister in the House of Commons, March 19, 1942)

ASSISTANCE TO MEDICAL STUDENTS

1. It is estimated that the Armed Services will during the ensuing fiscal year require probably 800 Medical Officers, of whom 50 will be needed by the Navy, 600 by the Army and 150 by the Air Force. As a matter of fact, the Army could take on almost at once probably 150 Medical Officers, and the Air Force, I am informed, probably 75 to 100. These requirements are being brought to the attention of the medical profession throughout Canada and the Canadian Medical Association is co-operating by sending out a questionnaire to all members of the profession.

2. In order to assist in increasing the future supply of Medical Officers for the Armed Forces the Medical Services of the Navy, Army and Air are co-operating in a scheme designed to aid worthy students of medicine who propose to enlist.

3. This arrangement is the result of a thorough study of the medical needs of the Armed Forces and has been proposed after consultation with the Medical Faculties of the universities throughout Canada. Briefly the scheme is as follows: (*a*) The universities will be asked to accelerate their courses, while maintaining the same standard of training, by reducing the normal summer vacation periods to a minimum. (*b*) In this way a student will be able to cover his full course in a considerably shorter period. (*c*) By this acceleration of courses students will be debarred from earning in the long summer vacation. The plan is designed to make up for this loss of income. (*d*) It is proposed that the Armed Services will enlist students at any time during the two final years before they qualify for a licence to practise. They will thus, during this period, become members of the Armed Forces and will then be granted leave with pay and subsistence allowance which will enable them to complete their courses and to obtain a licence to practise.

4. This assistance to medical students who intend to join the Armed Forces will be supplemented by the Department of Labour (in co-operation with the Provincial Governments) by extending the present system of scholarships. These scholarships (up to a maximum of perhaps $300) will also be open to other worthy students who because of the acceleration of the courses will be deprived of the opportunity to earn during what would be the normal vacation period.

5. The students who will be eligible for these scholarships will be those who are in need of such assistance, who possess good academic standing and who give satisfactory assurance to serve in the national war effort in the capacity in which they have been trained.

6. There will also be some expenditure involved in connection with additional costs to universities on account of the accelerated courses.

7. The Department of Labour is now in correspondence with the Provincial Governments with a view to enlisting their co-operation in implementing this extended plan.

8. In the result, medical students who intend to join the Armed Forces will (after the first year) receive assistance from the Department of Labour, in co-operation with the Provincial Governments, by way of scholarships, during the earlier years of their courses, and during the last two years they will receive pay and subsistence allowance as duly enlisted members of the Armed Forces.

The Training of Medical Students

"If this war goes on much longer the standard of medical students, and therefore of medical education, is going to decline. The last two years have certainly confirmed the fears of those of us who saw from the beginning the defects of the present scheme whereby medical students are exempt from military service. No one will question that an adequate supply of fully qualified doctors is necessary for the Services; where some of us differ from authority is on the means by which this aim can best be attained. What is happening now is that the flower of our youth are going into the Services as soon as they come of military age, either from school or after one or two years at the university. Whatever the calling-up regulations, no self-respecting youth likes the idea of spending the rest of the war studying for a profession while his contemporaries are fighting in the Middle or Far East, and it is going to take strong arguments to make him believe that he is best serving his country by leading a life of comparative comfort and security as a medical student. There are probably a few skrimshankers who see in the reservation of medical students an opportunity of evading all responsibility, unpleasantness and risk to life—but I have had practically no experience of these because our medical school has more applicants than vacancies. The effect on the ordinary youth, however, is becoming gradually serious. He can begin by reasoning that he will serve his country by continuing his medical studies—if he were not doing so the Government would no longer reserve him—but when he sees all his contemporaries in uniform, hears how the war is progressing and discovers the inevitable attitude of strangers who only see a healthy young man in civilian dress, doubts creep in. He finds it increasingly difficult to concentrate on his work, sparetime service in the Home Guard seems impracticable, and in the end he does scant justice to himself, his work and his country. The inevitable is already happening: the more enterprising students are leaving to join the Services. No obstacle can be put in the way of junior men, but with those nearing qualification some remonstrance is indicated. One student who approached me recently for my advice felt he could no longer continue with his studies—he must go into one of the Services. 'All honour to you,' was my reply; 'but before coming to a final decision just consider this point: you tell me that it will take six months to complete the training for the particular branch you are proposing to join; in another nine months you will be qualified and therefore able to join the Services as a fully qualified medical officer. If you give up medicine now it will take six years to train whoever replaces you here. In other words, in order to be able to satisfy your praiseworthy ambition of serving your country three months earlier you are prepared to deprive your country of the services of a much-needed medical officer for six years.' He had never thought of it in that way; but he did subsequently, and now he is getting down to work as he has not been able to do for months. I have not the slightest doubt that in nine months he will have qualified.

"My solution of the whole problem is, like all paper-schemes, simplicity itself. Conscript every male at the appropriate age and second the necessary number for medical studies. Keep them in uniform, make them attend regular drills during the week, exercises at the weekend and large-scale manœuvres for 2 to 3 weeks each year. In this way you will inculcate military discipline, keep the men physically fit, and teach them how to use a rifle or tommy-gun. The King's uniform will preserve and even enhance their self-respect. Their studies will be interrupted less than they are at present and the country will have at its disposal a useful body of efficient, keen and highly trained young men instead of a rather dissatisfied, untrained collection who could do little in an invasion. To put medical students into uniform would certainly be a move in the right direction.

"Otherwise we are faced with a reversion to the methods of the last war, whereby medical students were recruited as ordinary combatants and subsequently released to complete their studies when medical personnel became scarce. In my experience men who qualified under that regimen are not inferior in any respect to their colleagues who qualified before or after that war; in many ways they are better doctors, partly because they were of the type who volunteered for active service at the earliest possible moment, partly because their experience in the Army produced a more mature and experienced outlook on life. That the present system is failing is suggested by recent final examination results which show a definite fall in the standard expected. Conditions of work may have been difficult, but if you grant your

medical student exemption from military service and do not restrict the period necessary for qualifying you have no right to lower the standard."—From "In England Now", *The Lancet*, February 28, 1942.

War Literature

BRITISH MEDICAL JOURNAL

Clover Instead of Heparin (leading article), 1942, **1**: 78.
Planned Nutrition in Wartime: the Importance of Vegetables, J. C. Drummond (reports of Societies), 1942, **1**: 123.
War Neurosis, I, J. A. Hadfield, 1942, **2**: 1285.
War Neurosis, II, J. A. Hadfield, 1942, **1**: 320.
Wartime Problems in Parasitology (meeting of Association of Applied Biologists), 1942, **1**: 334.
Eye Lesions from Mustard Gas, Ida Mann, 1942, **1**: 353.
Abdominal Lesions in Warfare, Rear-Admiral G. Gordon-Taylor, 1942, **1**: 366.

JOURNAL OF THE ROYAL NAVAL MEDICAL SERVICE

War Burns, A. T. L. Maitland, 1942, **28**: 3.

THE LANCET

Experimental Wounds Treated with Cod-liver Oil and Related Substances, Lotte Dann *et al.*, 1942, **1**: 95.
Blood Viscosity, Philip Evans, 1942, **1**: 162.
Vital Statistics of the Second Year of the War, Percy Stocks, 1942, **1**: 189.

THE MILITARY SURGEON

Rehabilitation and Follow-up of Selective Service in Men Rejected for Military Service, Major-Gen. C. R. Reynolds, 1942, **90**: 232.
Some Problems of Selective Service, L. G. Rowntree, 1942, **90**: 238.
Blood Substitutes in the Military Service, D. B. Kendrick *et al.*, 1942, **90**: 306.

PROCEEDINGS OF THE ROYAL SOCIETY OF MEDICINE

The Foot-problem in Service Cases, H. L-C. Wood, 1942, **35**: 193.

BOOKS AND PAMPHLETS

A Pamphlet on Lice, John Smart (British Museum, Economic Series No. 2A), Trustees of British Museum, London, price 6d.

University Notes

McGill University

Fellowships valued at $2,500 have been granted to two members of the McGill University staff by the John Simon Guggenheim Foundation, New York, for advanced study and research in their particular fields. Two similar awards were made to University of Toronto professors.

The awards were made to Dr. C. Leonard Huskins, professor of genetics and chairman of the department, and Dr. Simon Dworkin, lecturer in physiology and well-known research worker in the field of conditioned reflexes.

An anonymous gift of $3,000 to the Archibald Cancer Research Fund was announced at McGill University recently, following a meeting of the university Board of Governors. Research in cancer, supervised by Dr. E. W. Archibald, who is now serving in a national capacity at Ottawa, has been maintained for a number of years at McGill through the fund.

This was one of a series of gifts announced recently in support of important research, and in aid of scholarships and other vital aspects of the larger university program in wartime and for the peace which will follow.

The John and Mary R. Markle Foundation made a grant of $2,200 in support of Dr. Hans Selye's investigation on the anæsthetic effect of steroid compounds. Mrs. J. R. Fraser made a donation of $1,200 to maintain the Clara Law Research Fund.

Applications of students for admission to the faculty of medicine of McGill have been somewhat in excess of former years. Last year there were 664 applicants as compared to 732 during this session. Of this number about 150 originated from sources within the British Empire and the majority of the remainder are from the United States. It is expected that about 115 applicants will be accepted and will register on September 8th.

Upper class men in medicine however will attend a summer session extending from June 15th to August 8th inclusive which will count as a trimester. This will enable the senior class to finish their course and begin their internship on February 1, 1943, and will enable the Junior and Sophomore classes to make corresponding advances in the dates when their training will be completed.

University of Montreal

The Faculty of Medicine of the University of Montreal announces the appointment of three new associate professors. Dr. J. Riopelle becomes professor of anatomy-pathology, Dr. Poirier, professor of dermato-syphilography, and Dr. Fontaine, medico-legal expert, professor of legal medicine.

University of Toronto

Faculty of Medicine.—Medals, prizes, scholarships and bursaries, March, 1942: the Faculty Gold Medals, J. G. Mickler and W. Wise (*Aeq.*); the Ellen Mickle Fellowship, W. Wise; the Chappell Prize in Clinical Medicine, M. W. Johnston; the William John Hendry Memorial Scholarship in Obstetrics and Gynæcology, J. W. Rogers; the Ontario Medical Association Prize in Hygiene and Preventive Medicine, V. Hertzman; the David Dunlap Memorial Scholarship, J. W. Rogers; the David Dunlap Memorial Scholarship (Fifth Year), D. W. Best; the Ronald S. Saddington Medal in Pathology, H. Goldenberg; the John Copp Bursary, H. A. MacMillan.

Abstracts from Current Literature

Medicine

The Early Diagnosis of Syphilitic Aortitis. Boharas, S., Hollander, L. and Goldsmith, M.: *Am. J. M. Sc.*, 1942, **203**: 54.

The authors have studied 200 patients with early or uncomplicated aortic syphilis and compared the clinical and radiological findings with those from a series of 200 normal controls, and have come to the conclusion that there is no single pathognomonic sign of early syphilitic aortitis discernible either by roentgen rays, electrocardiogram, or physical examination. They believe that it is impossible at present to make a positive clinical diagnosis of early syphilitic aortitis. Even relatively late cases of aortitis commonly fail to show any clinical indications that the disease exists, although radiological examination will frequently reveal the condition.

The diagnostic criteria laid down by Moore and his associates are, they believe, indications of serious complications rather than of the disease itself. These are (1) teleroentgenographic and fluoroscopic evidence of aortic dilatation; (2) increased retromanubrial dullness; (3) a history of circulatory embarrassment; (4) a tympanitic bell-like accentuation of the aortic second sound; (5) progressive cardiac failure; (6) substernal pain; (7) paroxysmal dyspnœa. They believe that these findings indicate such complications as saccular aneurysm, valvular insufficiency, stenosis of the coronary orifice or some myocardial degenerative process.

E. S. MILLS

Distribution géographique de l'ulcère gastrique et de l'ulcère duodénal dans les Iles Britanniques. Nicol, B. M.: *Brit. M. J.*, 1941, **2**: 780.

Cette étude faite en 1938 et 1939 montre que le rapport entre l'ulcère duodénal et gastrique est variable en Angleterre: de 1 à 1 à Londres, 2.8 à 1 dans le Leeds, et de 8 à 1 en Ecosse. Par rapport aux sexes le rapport est constant étant de 3 hommes pour 1 femme dans toutes les régions de l'Angleterre.

L'étiologie de l'ulcère duodénal et gastrique présente les particularités suivantes:

1°—La majorité des ulcères duodénaux commence à la troisième décade de la vie. Le début de l'ulcère gastrique varie uniformément de 20 à 60 ans.

2°—Dans plus de la moitié des cas, et ceci pour l'ulcère duodénal on retrouve une histoire familiale ulcéreuse.

3°—L'anxiété est le facteur causal le plus important dans l'ulcère duodénal. Pour ce qui regarde l'ulcère gastrique on retrouve plutôt les vices d'alimentation ou les infections.

L'auteur avance l'hypothèse suivante: il y aurait deux facteurs étiologiques dans la maladie ulcéreuse: (*a*) un facteur "D", cause d'ulcère duodénal, agissant essentiellement par l'intermédiaire du système nerveux, survenant à la troisième décade de la vie et héréditaire; (*b*) un facteur "G" cause d'ulcère gastrique, agissant par traumatisme de la muqueuse gastrique, survenant indifféremment de 20 à 60 ans et non héréditaire.

L'auteur suggère que la fréquence de l'ulcère duodénal est due à l'augmentation du facteur "D", (anxiété, surménage, etc.).

La haute proportion de l'ulcère gastrique dans les hopitaux de Londres, est vraisemblablement due au fait que la majorité des ulcères duodénaux sont traités à domicile.

YVES CHAPUT

Surgery

Local Implantation of Sulfanilamide and its Derivatives in Wounds. Harrison, S. P. and Key, J. A.: *Arch. Surg.*, 1942, **44**: 22.

This article is concerned with the experimental implantation of sulfanilamide and its derivatives in wounds and its relation to wound healing and to peritoneal adhesions. Adult guinea pigs and white rats were used. The authors conclude that "the local implantation for moderate amount of sulfanilamide in wounds of the abdominal wall and in wounds of the stomach and the duodenum of experimental animals does not appreciably interfere with the healing of these wounds. Such wounds when tested show approximately the same tensile strength as similar wounds in which sulfanilamide and its derivatives have not been implanted. The introduction of sulfanilamide, sulfathiazole, sulfathiszinc and mixtures of sulfanilamide and sulfathiazole into the peritoneal cavity does not tend to cause adhesions in the rat.

G. E. LEARMONTH

The Treatment of Dislocation of the Acromioclavicular Joint by Open Reduction and Threaded Wire Fixation. Phemister, D. B.: *J. Bone & Joint Surg.*, 1942, **24**: 166.

The writer describes yet another method of treating the complete dislocations of this joint, whether recent or chronic, with persistent symptoms. The method consists of open exposure of the area and the insertion of two steel wires through the acromion, joint space, and into the clavicle for a distance of one inch, the displacement being reduced. Enough wire is left outside the acromion for subsequent removal. The wound is closed and the area bound in Velpeau bandage for one month, followed by bandage of arm only to the side for a further month. After this period the wires are removed and the shoulder re-educated. Two cases are given illustrating the method.

As is quickly seen this is similar to the method of Murray, who employs a Kirschner wire which is subsequently removed. Recently also a method using a vitallium screw through the clavicle into the coracoid has been advocated. Gurd

suggests the removal of the outer end of the clavicle on both early and late cases. However the method of Bunnell, using a fascial strip to reconstitute the torn conoid and trapezoid ligaments as well as the superior acromio-clavicular ligament appears to be the rational procedure.

H. F. MOSELEY

Invagination intestinale chez les adultes. Considérations sur les procédés thérapeutiques et relation d'un cas. Nichols, H. G.: *Surg., Gyn. & Obst.*, 1941, **73**: 832.

L'invagination est une affection surtout commune à l'enfance et à la première jeunesse. Lorsqu'elle survient chez les adultes, elle est presque toujours grave, liée à une tumeur au à un ulcère; elle peut être située à n'importe quel niveau entre l'estomac et le rectum et, chez le vivant, en direction descendante. Considérant l'invagination comme une forme d'obstruction intestinale avec étranglement, la thérapeutique vise: à faire disparaître l'obstruction, à rétablir le transit et à corriger si possible les facteurs étiologiques défectueux.

En présence d'altérations intestinales graves, la résection s'impose. Le chirurgien jugera s'il doit la pratiquer en un ou deux temps. Lorsqu'une réduction suffit, il reste à prévenir les récidives possibles. Dans les cas d'invagination chronique du sigmoïde, qui sont les plus fréquents, Bayard recommande: (*a*) la plicature du méso-sigmoïde aux dimensions trop considérables; (*b*) la suture des bandelettes longitudinales à l'aponévrose du psoas; (*c*) l'élévation du plancher pelvien et l'oblitération du cul-de-sac de Douglas. Ces mesures peuvent être efficaces en l'absence de tumeur. Certains chirurgiens estiment que les mesures préventives ne doivent pas être tentées.

PIERRE SMITH

Experiences with Spool Cotton as a Suture Material. Thorek, P.: *Am. J. Surg.*, 1942, **55**: 118.

This is a report on 150 major surgical procedures done over a six months' period, using cotton. The author's interest was aroused on finding that Ochsner was using this material routinely. Thorek had already discarded absorbable sutures because healing occurred with excessive exudate, and was using Pagenstecher linen. He found that cotton does not fray as does linen and silk, probably because it twists naturally. Mercerized cotton has greater tensile strength. Sterilization is accomplished by autoclaving for ten minutes at 15 lb. pressure or boiling for twenty minutes.

Usually the author used No. 24 white or black spool cotton. For superficial vessels: No. 80 is fine and suitable. Quilting cotton is about size 50 and was found suitable for seroserous sutures and purse strings.

It was the author's experience that no draining sinuses such as sometimes occur when using silk, no evisceration or gastro-intestinal leak occurred. The series included all common major operations, even ruptured appendicitis and tendon suture. For gastric resection cotton is used, except for the 2nd suture line, where 00 chromic catgut seemed preferable for the through and through stitch. The tensile strength in tissues does not diminish as does that of catgut, linen and silk.

BURNS PLEWES

Treatment of Fresh Traumatic and Contaminated Surgical Wounds. Bisgard, J. D. and Baker, C. P., *Surg., Gyn. & Obst.*, 1942, **74**: 20.

This is a detailed technique, confirmed by experimental work on rabbits, in the treatment of wounds. Reliance is placed on the use of copious saline lavage with and without the wiping action of gauze to remove all foreign material. Primary wound débridement (not excision of edges) is practised. Twenty-five fresh major injuries, 20 of which were grossly contaminated, healed without pus formation in any of them. In a series of 31 cases of potential peritonitis a similar technique of the abdominal wall resulted in only 2 cases developing suppuration in the wall. A small amount of sulfanilamide powder is dusted into the wound before closure.

FRANK DORRANCE

A Study in the Mechanics of Bile Flow: Responses to Physiological Intravenous Solutions. Kozoll, D. D. and Necheles, H.: *Surg., Gyn. & Obst.*, 1942, **74**: 27.

Distinctly interesting observations on dogs are given. The procedure followed is described in detail: briefly it consisted of condom-balloons in the distal part of the duodenum, in the gall-bladder, between the upper surface of the liver and the under surface of the diaphragm, a T-tube cannula in the separated distal portion of the common bile duct through which fluids could be inserted, at the same time allowing the sphincter of Oddi its action. Simultaneous recordings were made from the duodenum, gall-bladder, sphincter of Oddi, respiration and blood pressure (from cannula in the common carotid artery). Intravenous solutions were given in the femoral vein. The conclusion is reached that sphincter action is independent of the duodenal activity; normal and hypertonic saline produce prolonged spasm of the sphincter and of the duodenum; 5 per cent glucose in normal saline produces an unpredictable effect probably midway between that of glucose in distilled water which seems to relax the duodenum and moderately contract the sphincter but not preventing free flow of bile. Atropine or trasentin intravenously can prevent or reduce the spasms produced by normal saline but not those of hypertonic saline.

FRANK DORRANCE

Obstetrics and Gynæcology

Maternal Pulmonary Embolism by Amniotic Fluid as a Cause of Obstetric Shock. Steiner, P. E. and Lushbaugh, C. C.: *J. Am. M. Ass.*, 1941, **117**: 1245 and 1340.

This important paper deals with maternal deaths during labour or early in the puerperium, not explainable by the usual factors of hæmorrhage, toxæmia, heart disease, etc. It reports the deaths of eight women in labour or shortly after, in which microscopic examination of the lungs showed pulmonary embolism by particulate matter from amniotic fluid. These cases differ from those instances of pulmonary embolism in which large thrombi originating in the maternal systemic venous system, or air or placental fragments are the causes of blocking the pulmonary veins.

The clinical histories of these cases reveal the following important points: (1) all the mothers except one were multiparas. (2) The age of the woman was greater than that of a group of mothers selected at random, the youngest being 25, the oldest being 42, with an average age of 32. (3) The tone of the uterus was much stronger than normal, there being uterine tetany in two cases, and the contractions in others being described as "violent", "powerful", etc. (4) The amniotic fluid contained meconium in four cases, also blood in one and possibly two of these. Data are lacking on the presence of meconium in the fluid in the other four cases, but in two of these the fetuses had been dead for two and three weeks respectively, so probably meconium was present in these cases also. The fetuses were macerated, with the result that the amniotic fluid contained an excess of particulate matter. (5) The fetuses were exceptionally large (the largest weighed 5,568 gm.), six of them being above the average weight of 3,400 gm. (6) The fetus was dead in four cases before labour began, and another fetus was in such poor condition that it died shortly after birth. (7) The pregnancy was of longer duration than normal in some of these cases.

The diagnosis of this condition rests at present upon the demonstration in the lungs of the massive embolism by particulate matter from the amniotic fluid, although symptoms of shock in a woman with unusually severe labour should suggest it. Its treatment should be directed toward the prevention of the condition. If excess vernix caseosa is due to vitamin A deficiency in the mother as has been suggested, then adequate administration of this vitamin should decrease this type of embolism. The prevention of meconium in the amniotic fluid would be accomplished by controlling those conditions leading to its presence there.

The incidence of this condition terminating fatally was 0.2 per cent in general autopsies, and 1 in 8,000 confinements. It occurred in 11 per cent of the obstetric deaths dying between the seventh month of gestation and during the puerperium. It thus assumes a greater significance than the figures of 1 in 8,000 confinements would at first indicate. It was the commonest cause of death during labour and the nine hours following delivery. Therefore it must be regarded not as a rarity among obstetric complications, but as one of the commonest.

MADGE THURLOW MACKLIN

Sacro-iliac Strain. Cyriax, J.: *Brit. M. J.*, 1941, **2**: 847.

The outstanding symptom is a deep sacral ache, aggravated by exercise and relieved by rest. The signs of sacro-iliac strain are pain on stretching the anterior sacro-iliac ligaments, on stretching the posterior sacro-iliac ligaments, on attempting forward luxation of the sacrum, and on forcing rotation at the joint.

The cause of sacro-iliac strain is non-traumatic, general, peculiar to women and temporary. There is a possibility of an endocrine element in the etiology. Existence of very slight lengthening of the ligaments toward the end of pregnancy has been demonstrated and measured radiographically. Sacro-iliac strain may in future come to be regarded as due to a temporary over-secretion of a theoretical special hormone of the corpus luteum, relaxin, and is thus in essence a medical rather than a surgical condition.

The treatment is immobilization, best obtained by a corset that holds the ilia firmly against the sacrum. It should be worn day and night until the pain on waking disappears; thereafter it need be worn only by day. After several months, if full relief has been obtained meanwhile, the patient may try increasing periods up and about without the corset. Throughout she should be warned to do nothing that hurts, and to rest at once if pain begins.

ROSS MITCHELL

Pædiatrics

A Discussion on the Origin of Cysts of the Broad Ligament. Gilbert, B. and Sheorey, B. K.: *J. Obst. & Gyn. of the Brit. Emp.*, 1941, **48**: 549.

The authors have clearly traced the embryology of broad ligament cysts. The article is a delightful one for gynæcologists who are especially interested in embryology and gynæcological pathology.

The origin of the vestigial structures of the broad ligament and mesovarium are described, including the origin of the pronephros, mesonephros, metanephros and the gonads. The junctional tubular system is considered in detail, with its pathological significance, and the fate of the pronephric, Wolffian and Mullerian systems is considered.

The sites of origin of broad ligament cysts are deduced from the embryology and the special features of each variety of cyst are described. The clinical history and pathology of a broad

ligament cyst which had undergone torsion is given. In the general discussion the special features of junctional tubule cysts are presented, together with the mechanism of torsion. The loose use of the term "parovarian cyst" is criticized and other recommendations made, while suggestions are made concerning the origin of the Walthard islands and Brenner tumours.
P. J. KEARNS

Encopresis (Incontinence of Fæces) in Children. Burns, C.: *Brit. M. J.*, 1941, **2**: 767.

The term "encopresis" was suggested by Weissenberg (1926) for those cases of incontinence of fæces in which no definite organic lesion is found. As a short descriptive term it has much to recommend it. Encopresis is often a symptom of severe neurosis, but is to be distinguished from simple soiling due to lack of training or of lavatory facilities. The cases may be divided into (1) soiling; (2) neurotic cases; (3) cases associated with conditions of an epileptic type.

Reports of cases are given from the records of a Child Guidance Clinic, showing that the condition is associated with feelings of aggression and fear and is a symptom of protest against the environment. In some cases, particularly in adolescent girls, it is found in association with preoccupation in matters of sex.

Apart from the etiological factors found in the history, proof of psychogenic nature of the condition is furnished by the results of psychological treatment. At the same time physical factors cannot be disregarded. Constipation with impacted fæces may actually cause diarrhœa.

Among methods of treatment are mentioned: (1) Enquiry by the family doctor into the child's habits and environment accompanied by simple advice and medicine (*e.g.*, pulv. cretæ). (2) Treatment at a hospital or suitable institution such as an open-air school. (3) Psychological treatment, chiefly by play therapy, at a child guidance clinic. Change of environment may be necessary.

Urology

Experimental and Clinical Evidence on the Rôle of the 17 Keto-steroids in Prostatic Carcinoma. Satterthwaite, R. W., Hill, J. H. and Packard, E. F.: *J. Urol.*, 1941, **46**: 1149.

The excretion in the urine of 17 keto-steroids may be diminished after many operations, but following bilateral orchidectomy for carcinoma of the prostate this decrease may have especial significance. Ten cases were followed. The quantitative reduction in the twenty-four hour output of this hormone-related substance was thought to be in proportion to the subsequent clinical improvement. It is suggested that the estimation of the keto-steroid output in the urine might serve as an early indication of the probable effect of the castration in individual cases of carcinoma of the prostate. DAVID R. MITCHELL

Leiomyosarcoma of the Prostate. Prince, C. I. and Vest, S. A.: *J. Urol.*, 1941, **46**: 1129.

The case presented is now alive and apparently free of recurrence twelve months after radical perineal prostatectomy. There are only fifteen authentic cases in the literature. There is no relationship to adenoma or carcinoma of the prostate. Diagnosis is difficult except where age gives a clue. Only two have been diagnosed pre-operatively. Duration of life before twenty years of age averages two and a half months, while over twenty years it is 3.2 years not including two cases still alive. Hence the prognosis is better than for any other type of sarcoma occurring in the prostate. Operation is the only hope. DAVID R. MITCHELL

Neurology and Psychiatry

Analysis of Three Hundred and Seventy-three Cases of Acute Craniocerebral Injury. Pilcher, C. and Angelucci, R.: *War Med.*, 1942, **2**: 114.

There is an urgent need for some method of classifying injuries of the head in order to allow the comparison of groups of identical cases. An ideal classification should be based on the pathological processes which are present, but there are too many gaps in our present knowledge and too few cases are examined pathologically to make such a system satisfactory. The authors have analyzed 373 cases of acute craniocerebral injury on the basis of the prognostic significance of clinical signs. It is apparent from the analysis that the most reliable basis for a clinical classification is the duration of disturbance of consciousness. Since this factor cannot be determined at the time of injury it is not of immediate prognostic importance, but it is of importance in the ultimate classification of cases. Signs noted within the first few hours of injury may be divided into three groups.

1. *Signs of grave prognostic importance.*—These signs occurred almost exclusively in the most seriously injured groups. (*a*) Temperate over 103° F.; (*b*) irregular, laboured or periodic respirations; (*c*) compound fractures; (*d*) pupillary abnormalities; (*e*) severe paralysis.

2. *Signs indicating that the injury probably is severe.*—These signs occurred with increasing frequency in the severely injured groups but were present in some mildly injured patients. (*a*) Mild neurological signs; (*b*) temperature 100 to 103° F.; (*c*) pulse rate over 100 per minute; (*d*) respiratory rate over 28 per minute; (*e*) systolic blood pressure under 90 mm,; (*f*) pulse pressure under 30 mm. or over 70 mm.; (*g*) fractures of the skull; (*h*) convulsions.

3. *Signs of little value.*—These signs occurred so rarely or were distributed so equally as to be of no significance. (*a*) Marked elevation of systolic blood pressure; (*b*) slow pulse rate; (*c*) slow respiratory rate. FRANK TURNBULL

Sciatic Pain: Its Significance in the Diagnosis of Cauda Equina Tumours. Kaplan, A., Barder, M. and Sapirstein, M.: *J. Bone & Joint Surg.*, 1942, **24**: 193.

Recently the diagnosis of herniation of nucleus pulposus has been made with increasing frequency in cases of sciatica. There is a tendency to overlook other possible causes of the "sciatic syndrome". Sciatic pain may continue for varying periods as a result of tumour of the cauda equina, and yet repeated clinical examinations fail to show any abnormal objective finding. The authors report four cases of sciatica in which neoplasms of the cauda equina were discovered and removed. In all four cases there were no motor, sensory, reflex or sphincteric disturbances. The diagnosis was established by combined study of the spinal and intraspinal lipiadol injection. FRANK TURNBULL

Pathology and Experimental Medicine

Observations on the Etiologic Relationship of Achylia Gastrica to Pernicious Anæmia. IX. Difference in site of Secretion of Intrinsic Factor in the Hog and in the Human Stomach. Fox, H. J. and Castle, W. B.: *Am. J. M. Sc.*, 1942, **203**: 18.

The authors have fed desiccated fractions of hog and human stomachs to patients suffering from pernicious anæmia in an attempt to locate the site of formation of the intrinsic factor concerned in erythropoiesis. If the patient showed improvement, then the powder administered was considered to contain the intrinsic factor. Meulengracht had previously conducted similar experiments, using only fractions of hog's stomach. His conclusions were that the pyloric gland organ was the chief site of formation of the intrinsic factor. He inferred from these experiments that similar conditions obtained in the human stomach. Castle and his associate confirmed Meulengracht's experiments, but found that the human stomach differs from that of the hog in that the cardia is the active site of secretion of the intrinsic factor, not the pyloric gland organ. This site corresponds with that in which degenerative processes are actually found in pernicious anæmia and explains the fact that pernicious anæmia is rare after gastric resections in the human subject. E. S. MILLS

Therapeutics

Further Studies on Recurrences in Pneumococcic Pneumonia with Special Reference to the Effects of Specific Treatment. Strauss, E. and Finland, M.: *Ann. Int. Med.*, 1942, **16**: 17.

A study of 168 patients with 191 recurrent attacks of pneumococcic pneumonia is presented. The initial and subsequent attacks did not differ significantly in the character or site of the pulmonary lesions, or in the distribution of the types of pneumococci involved. There was no increased tendency for recurrent attacks to be bilateral. Chronic pulmonary disease was a predisposing factor in only 15 per cent of the patients. In such patients the attacks tended to recur at shorter intervals. The duration of the recurrent attacks was the same as or shorter than in the original infections. The frequency with which the same type was present in successive attacks was inversely proportional to the length of the interval between attacks. Type III was more frequently present in successive attacks than any other type.

Successive attacks with the same type of pneumococcus were not more frequent in patients with chronic pulmonary disease than in other patients. Recurrences were not more frequent in patients treated with sulfonamide drugs in the first attack than in those treated with serum, or in those treated non-specifically, but there was a tendency in drug-treated cases for second attacks to occur with the same type, and at shorter intervals. There is some indirect evidence that early recurrences with the same type of pneumococcus are associated with a persistence of the carrier state. There is no correlation between the antibody response and the tendency of pneumonia to recur. S. R. TOWNSEND

The Treatment of Angina Pectoris with Testosterone Propionate. Lesser, M. A.: *New Eng. J. of Med.*, 1942, **226**: 51.

Twenty-four patients, twenty men and four women, varying in age from forty to seventy-seven years, in whom the diagnosis of angina pectoris was clearly established, were treated with testosterone propionate. Twenty-five milligrams were given intramuscularly every second to fifth day for an average of eleven injections and favourable results were obtained in all cases with definite benefit persisting for from two to twelve months. The frequency, duration and severity of the attacks of angina were diminished and exercise tolerance was increased. Much better results were obtained in the male patients but too much importance could not be attached to this, because of the small number of women in the series. Control injections of plain sesame oil caused no appreciable improvement in patients that subsequently responded to testosterone. No untoward effects were noted.
NORMAN S. SKINNER

Bacteriostatic Properties of Sulfanilamide and Some of its Derivatives. Potts, E. J. and Knotts, F. L. *et al.*: *Arch. Surg.*, 1942, **44**: 187.

The authors record the results of experimental studies on dogs with succinylsulfathiazole, a new chemotherapeutic agent locally active in the gastro-intestinal tract. In their study the bacteriostatic activity of sulfanilamide and various derivatives and combinations of these compounds

(18 drugs in all) was investigated. The results of these studies on both the experimental animal and on man are discussed under three heads: (1) antibacterial activity as shown by the effects on the coliform organism in the stool; (2) absorption and excretion and (3) toxicity.

Their investigations showed that succinylsulfathiazole is relatively resistant to chemical hydrolysis. It is plit by bacteria to yield sulfathiazole. *In vitro* it has low bacteriostatic activity against *B. coli* in synthetic mediums. It is poorly absorbed from the gastro-intestinal tract of man. A high concentration of succinylsulfathiazole can be maintained in the intestinal tract of man without causing untoward toxic reactions. It has a high bacteriostatic action in the gastro-intestinal tract of man as measured by the inhibition of the coliform flora of the bowel. This drug causes profound changes in the stools as they become semifluid and relatively odourless. It is rapidly excreted by the kidneys as well as by the liver. There was significant lowering of the coliform organisms in the bowel in over 90 per cent of instances with adequate doses of this drug. It is effective in the presence of extensive ulcerative lesions of the bowel.

The authors suggest the use of this drug for the pre-operative preparation of patients requiring operative procedures on the gastro-intestinal tract and for the treatment of acute intestinal infections such as typhoid fever and dysentery.

G. E. LEARMONTH

Treatment of Rheumatoid Arthritis in Children. Roden, D.: *Brit. M. J.*, 1942, **1**: 102.

The following therapeutic measures are reported to be of value in the treatment of Still's disease. Management of infected foci, vaccines or filtrates, foreign proteins, diet, vitamins, blood transfusion, gold salts, artificial jaundice, physical therapy.

The conservative removal of obviously infected foci is generally recommended. Vaccine therapy has been considered effective by some and has a place in treatment, but not as a specific. Foreign proteins stimulate metabolism by the fever produced, however this is difficult to control and not without danger. High vitamin, high calorie, low carbohydrate diet is considered advantageous. Gold salts seem to be of value. It should be confined to patients in whom the disease is active, as judged by high sedimentation rate, low hæmoglobin, loss of weight, joint swelling and pain. Their dangerous toxic effects should be closely watched. Injections of bilirubin combined with bile salts have given temporary amelioration in some cases.

Physical therapy is one of our most effective weapons against eventual restriction of function in the atrophic type of arthritis. Rest in bed is of importance when the disease is active. Complete immobilization of a limb by a splint should rarely last more than one week. Exercise must be gradual, supervised and of the active assisted variety until pain is experienced. Massage delays and prevents atrophy, aids circulations and improves metabolism. Other physical agents as heat, hydrotherapy, iontophoresis, low frequency currents are given consideration. The author includes 2 case reports under various forms of management. It is emphasized that all treatments should be carried out concurrently.

K. L. MCALPINE

Hygiene and Public Health

Clinical Manifestations of Tetryl and Trinitrotoluene. Hilton, J. and Swanston, C. N.: *Brit. M. J.*, 1941, **2**: 509.

The authors, who are medical officers to the Royal Ordnance Factory, describe the symptoms and treatment of tetryl and T.N.T. poisoning.

In general the effect of tetryl is more severe on the skin and less severe constitutionally than T.N.T. The tetryl dermatitis is described as beginning as an erythema and followed by a papular eruption with exfoliation. It is nearly always seen on the face and may give rise to gross œdema of the eyelids. The eyes may be completely closed for two or three days. Treatment consists in the use of a bland lotion like calamine lotion and removal from contact. Oily substances are said to be contraindicated as they facilitate absorption of the tetryl dust. Tetryl workers are said to suffer occasionally from epigastric pain, nausea and vomiting.

T.N.T. is a highly toxic substance. It may produce: (1) a dermatitis usually on the hands and forearms and not commonly on the face. (2) Cyanosis due to the formation of methæmoglobin and NO-hæmoglobin. This is not necessarily a dangerous sign, but bears close watching. (3) Toxic gastritis characterized by epigastric pain not related to food, nausea, anorexia and constipation. (4) Toxic jaundice due to severe liver damage. This is a sign of grave import and indicates prompt hospitalization. The mortality in jaundiced patients is said to be 30 per cent. (5) Aplastic anæmia also a very grave sign. There is very little discussion of preventive measures.

FRANK G. PEDLEY

Prevention of Droplet-borne Infections by Spray: A Field Experiment. Middleton, D. S. and Gilliland, I. C.: *The Lancet*, 1941, **2**: 598.

The authors refer to the increasing interest displayed in attempts to diminish the spread of droplet-borne infection by the use of a hypochlorite spray and they have tried to estimate the value of such a method by a controlled field experiment among troops accommodated in hutments.

A simple type of spray used for a commercial insecticide (Flit) was employed with 1 per cent solution of bleaching powder. The powder was of a kind used for the chlorination of water supplies. Three thousand personnel were subjected to spray with a similar number unsprayed as controls. Each hut was sprayed 3 times daily—

at reveille, on coming off duty in the late afternoon, and at bedtime—these being the periods at which the greatest concentration of salivary droplets was to be expected. All troops were accommodated under similar conditions and were exposed to outside contact with the civil populace to the same extent.

The incidence of droplet infection was diminished in the sprayed group by 37 per cent during the three months' period—January to March, 1941, but a close analysis of the figures suggests that the apparent diminution is attributable to an epidemic of catarrhal disease occurring in two out of a total of six unsprayed units. By contrast none of the six sprayed units developed a major catarrhal epidemic.

The authors suggest that favourable effects may be attributed to a combination of sedimentation, sterilization, laying of dust and a slow release of chlorine for six hours after spraying from dried articles of bleaching powder on floors and walls of huts.—Brit. Med. Inform. Service.

Obituaries

Dr. George W. Alexander, of Beachburg, died on April 6th at his home. He was a graduate of Trinity University, Toronto (1899) and practised in Stittsville, Ont., for a few years before coming to this district in 1903.

Dr. Charles Edward Lemaitre Auger, of St. Helène de Bagot, died after a long illness at St. Hyacinthe, Que., in his 75th year. He was a native of Louiseville and studied medicine at McGill University where he took his M.D. in 1891. He practised medicine at St. Helène for the past 50 years where he had been coroner and company doctor for the Canadian National Railways.

Dr. G. R. Deacon, of Stratford, Ont., died on March 22, 1942. He was born in 1874 and a graduate of McGill University (1896).

Dr. George Fierheller, of Toronto, died on February 9, 1942. He was born in 1860 and a graduate of Trinity University (1884).

Dr. Lewis Obid Fuller, of Shelburne, N.S., died on February 25, 1942. He had been active to within a few days of his passing. He was 66 years of age.

Dr. Fuller was born in Avonport, King's County. In 1904 he graduated in medicine from Dalhousie University. For thirty-eight years he played with sincere intensity his rôle of country doctor. He was friend and adviser as well as physician to a goodly part of Shelburne. A keen reader, an able speaker, his interests ranged over community problems, politics, and sports, reflecting everywhere the soundness he showed as a medical practitioner.

Dr. Herbert A. Gordon, of Portage la Prairie, Man., a former president of the Manitoba Medical Association, and a veteran of World War 1, died at his home in Portage la Prairie on March 31st, after a long illness.

Born in a parsonage in Tweed, Ont., he came to Manitoba with his parents, the Rev. Andrew and Mrs. Gordon, in 1882. He graduated from Wesley College, Winnipeg in 1895, and from Manitoba Medical College in 1899. His professional career was centred in Portage la Prairie, where for many years he was superintendent of the Home for Incurables. In the first World War he served with No. 3 Casualty Clearing Station, R.C.A.M.C., in England, the Dardanelles and France, attaining the rank of major.

Dr. John S. Hart, of Toronto, died on March 30, 1942. He had been an outstanding figure in medical circles in Toronto, for thirty years. Born 81 years ago at Wilfrid, Ont., Dr. Hart was the son of Joseph and Sarah Hart. He attended school at Port Perry, Ont., and was a graduate of both Victoria University (1888) and University of Toronto. Besides carrying on his practice in Parkdale, he was for many years attending physician at the Toronto Hospital for Incurables and surgeon to the Toronto Western Hospital.

Dr. Hart was a member of the Academy of Medicine, the Ontario Historical Society, a life member of the Ontario Medical Association and a member of the United Empire Loyalist Association.

He contributed considerably to the cause of medical science through his many articles in medical journals. Since 1920 he had not been practising extensively, but had maintained a consulting practice at his late residence. His son, Dr. J. L. Hart, is at present engaged in research work for the Dominion Government at Nanaimo, B.C.

Dr. James Frederick Hazlewood, of Toronto, died recently. He was at one time Director of the Public Health Laboratories, City Hall, Toronto. Born in Paris, Ont., in 1885, Dr. Hazlewood graduated in medicine from the University of Toronto in 1907. He also held the Diploma of D.P.H. of Toronto. He engaged in private practice for several years before becoming director of Public Health Laboratories. He served during the first Great War with the Canadian Army Medical Corps and held the rank of captain. He had been with the Workmen's Compensation Board for fifteen years.

The recent death of **Dr. George Whitfield Knipe,** of Vancouver, on February 6, 1942, will be a matter of regret to many who knew him in Manitoba, where he practised for many years in Winnipeg. He was born in 1876 and a graduate of the National University of Ireland (1906).

Dr. Joseph Jerome Alphonse Labrecque, of Vancouver, died there recently. He was also well known on the Prairies, where he practised many years before coming to Vancouver. He was born in 1871 and a graduate of Laval University, Que. (1893).

Lieut. Jacob Markowitz, Toronto surgeon and pathologist, has been posted as missing in Malaya since February 15th, according to a cable received by his mother, Mrs. J. Markowitz, of Toronto, on April 6th. He was serving with a base hospital unit of the Royal Army Medical Corps.

A graduate (1923) and former faculty member of the University of Toronto, Lieut. Markowitz held a long list of degrees and honours in pathology, physiology, experimental surgery and research. He taught at Glasgow University and the Mayo Foundation and until 1940 was professor of physiology at Georgetown University, Washington, D.C.

In February, 1940, he went to England where he joined the R.A.M.C. He was born in Toronto in 1901.

Dr. John Percival McKinnon, of Guelph, Ont., died on March 6, 1942. He was born in 1872 and a graduate of Toronto (1904).

Dr. Wiley Schell Millyard, of Coboconk, Ont., died suddenly on April 9, 1942, aged fifty-six. Born in Woodstock, Ont., Dr. Millyard was the son of a Methodist minister. He attended the University of

Toronto Medical College and graduated in 1908. Following post-graduate work in New York, he served as company doctor in the building of the Transcontinental Railway through Northern Ontario. Later he practised medicine in Grimsby and in Capreol, coming to Coboconk in 1920. For many years he had served as medical officer of health for the Townships of Digby, Longford, Bexley and Sommerville.

Dr. James Walter Mulligan, Fort Coulonge, Que., died on December 30, 1941. He was a graduate of McGill University (1905).

Dr. Alexander Robert Reid died at his home in Windsor, N.S., on March 10, 1942. For several months he had been fighting an illness that proved irresistible. He was forty-five years of age.

Dr. Reid was the son of the late Dr. James W. Reid, one of Nova Scotia's outstanding practitioners, and a member of the Provincial Legislature. He was born in Windsor in 1897 and graduated from the Dalhousie Medical School in 1920. For several years he practised in Newport, N.S., and after post-graduate study in Montreal and New York he returned to his native town in 1927.

In Windsor Ted Reid soon built a place and a good reputation for himself with his medical ability, his soundness, and the kindliness of his personality. The warmth of his father flowed in him, and this he matched with the skill of another generation which was his own. In his forty-five years he had accomplished much.

Dr. Paul Lindsay Scott, of Toronto, died on April 3, 1942, in his seventy-fourth year.

On the occasion of his retirement as head of the department of physiology only ten days before his death, Dr. Scott delivered an informal valedictory to this year's graduating class of the Ontario College of Pharmacy. He was widely known throughout the Province in his field.

Dr. Scott was born in Paris, Ont., in 1868. He graduated from the College of Pharmacy as a gold medalist in 1887 and in medicine from the University of Toronto in 1900. He established a medical practice in Toronto in 1901. For many years he was on the staff of the former St. John's Hospital. He was a member of the Royal Canadian Institute, the Academy of Medicine, and the Canadian Medical Association.

Dr. Duncan Smith, of Fingal, Ont., veteran general practitioner of West Elgin and resident of Fingal for 45 years, died at Parkwood Hospital, London, on March 29, 1942. He was seventy-three years of age and retired five years ago, a graduate of Toronto (1890). He was 20 years chairman of the Fingal School Board and was moving spirit in the erection of the continuation school. As medical officer of health for Southwold Township, his duties were exacting and brought heavy demands on his time.

Dr. David Donald Wickson, died at the Toronto Western Hospital on March 16th, ending a 30-year medical practice in Toronto.

Besides his own practice, Dr. Wickson was on the staff of the Toronto Western Hospital.

Dr. Wickson was born and educated in Toronto, attending Jesse Ketchum and Wellesley Public Schools, Jarvis Collegiate and the old Trinity Medical School. Following his graduation in 1893 he continued his studies at Edinburgh where he obtained his L.R.C.P.S. degree. Returning to Canada, he practised in Milton for 14 years, following which he came to Toronto in 1912.

News Items

Alberta

The Council of the College of Physicians and Surgeons has urged the Alberta Government to consider establishing psychopathic wards in some of the Alberta hospitals. It is reported that 200 extra rooms in the mental hospitals would be immediately filled on completion.

Of the 47 recent graduates in the University of Alberta, not a single one is taking up practice this summer. All are entering hospitals as interns.

Five former graduates, who finished their internships in February have joined the R.C.A.M.C., or R.C.A.F.: hence none are available for practice in the rural areas.

The Alberta Legislature appointed a special committee for the purpose of receiving representations and recommendations as to the operations of the Workmen's Compensation (Accident Fund) Act. The committee will meet between sessions and report to the next session of the Legislature in 1943.

The Workmen's Compensation Act has been amended to include the Order of Railway Conductors.

An effort was made by the City of Calgary to get permission from the Legislature, to erect an addition to the Calgary General Hospital without calling for a vote of the ratepayers. This the Legislature refused, so a vote will be taken in April, 1942, which it is expected will be approved.

An amendment to the Mental Defectives Act places the responsibility for the support of mental defectives in an institution on municipalities, with the right to recover from persons legally responsible for the maintenance of such persons.

A special edition of the *Alberta Medical Bulletin* is in the press, and will be well illustrated with numerous full page pictures of mountain scenery in connection with the Canadian Medical Association Convention at Jasper, in June, 1942.

G. E. LEARMONTH

British Columbia

Dr. T. C. Routley, General Secretary, Canadian Medical Association, paid a visit to British Columbia recently on Association matters. It had been hoped that he would address a luncheon meeting and meet the profession in others ways, but, unfortunately, a severe attack of "flu" made it necessary for him to cancel all engagements.

Doctors Wallace Wilson, Chairman of the Committee on Economics of the Canadian Medical Association and Murray Blair, representative from British Columbia on the Executive Committee of the Canadian Medical Association have gone East to attend the meeting of Executive being held in Ottawa.

The response to the questionnaire on Health Insurance that has been circulated throughout Canada has been very gratifying in British Columbia. The majority of the men here answered it, and many valuable and constructive suggestions were received.

The Executive Secretary of the British Columbia Medical Association, Dr. M. W. Thomas, has very carefully tabulated all the responses and they have been forwarded through Dr. Wallace Wilson to the Committee of Seven. Dr. Thomas spent considerable time and labour on this undertaking, and his summary is a valuable contribution to the work.

Many reservations have been made for the forthcoming Annual Meeting of the Canadian Medical Association at Jasper in June. Keen interest is being shown in this meeting throughout British Columbia.

J. H. MACDERMOT

Manitoba

A commission to investigate the hospital set-up of Manitoba, with a view to placing these institutions on an improved business basis was announced in the legislature by the Minister of Health and Public Welfare. It is hoped that in this way mounting deficits may be wiped out. In the meantime the Minister said the government would introduce legislature whereby municipalities could be billed for special services provided to public ward patients. The bills for such services would be in addition to the present rate of $1.50 per diem for each patient.

The member for Norfolk declared in the legislature that rural cases of the province lacked proper medical care. He urged that the rural members of the legislature get together to organize a campaign for establishing municipal doctor units.

Col. A. E. Snell, Director-General of Medical Services, Ottawa, recently inspected hospitals in Military District No. 10.

Major S. R. Laycock, Saskatoon, former professor of psychology at University of Saskatchewan, has taken up his post at Fort Osborne barracks as army examiner in charge of personal selection staff for military districts 10 and 12.

He succeeds Major E. H. Smith in the department, which aims to place recruits in the army jobs for which they are most fitted and in which they are most needed. Major Smith was recently transferred to the Pacific command.

The report of Dr. Carl E. Buck, field secretary for the American Public Health Association, who recently made a survey of Manitoba health facilities was submitted to the legislature on February 27th. Funds for the survey were supplied by the American Public Health Association:

Of 31 major recommendations one of the main ones in the report is the establishment of local health and welfare units with a specially trained physician experienced in public health administration as the director.

Separate from the $163,318 estimated cost of effecting the recommendations, Dr. Buck cuts off as a saving $150,000 from regular hospitalization expenditure.

Dr. Buck estimates that about 25 per cent of the cost of hospitalization, or $150,000, would be saved by the province if "emergency" cases were allowed care only when they were really emergency cases.

Taking a big slice of the new costs is the recommendation of a 250-bed mental hospital which will cost $75,000 annually for maintenance. No estimate is made for the building itself. A suggested site is Portage la Prairie.

Following are some of the other immediate undertakings advised: That one especially well-planned and well-staffed full-time health and welfare unit, covering from four to seven municipalities be established as a demonstration of what can be done in providing adequate local health and welfare services and be used as a training centre for personnel.

That the department take steps to make available young, well-qualified assistants to persons in executive positions. Higher salaries are urged.

That the Manitoba Sanatorium Board be abolished and in its place a Manitoba Tuberculosis Control Commission be established with 15 new members added to the old board. Costs to be borne by a review of the municipal tuberculosis tax levy.

That the department conduct on a regional basis short courses in preventive medicine and public health for municipal doctors.

That contracts between municipalities be revised to furnish more adequate protection for the physician.

That a hospital commission be appointed with a representative from the union of municipalities, the Manitoba Division of the Canadian Medical Association; the Manitoba Dental Association; the Manitoba Association of Registered Nurses, the provincial government, and a hospital representative, preferably from outside Manitoba.

A broad, widespread health educational program, to bring about local studies of health problems is urged to make the recommendations successful.

Supervision and consultation-advisory field service to local full-time health department is strongly recommended.

The Victorian Order of Nurses will take over on May 1st the free bedside nursing duties formerly carried on by the Margaret Scott Nursing Mission. The Margaret Scott Nursing Mission will devote all its facilities to general mission work after that date.

At the annual meeting of the Medical Arts Building on March 8th Mr. Harry Smith presented on behalf of his mother, his sister, and himself an oil painting of the late Dr. Harvey Smith to whose vision and initiative the Medical Arts Building is due. On behalf of the tenants Dr. Ross Mitchell received the gift. Dr. Egerton Pope, Professor of Medicine, University of Alberta, painted the picture for the Hobbies Exhibition at the meeting of the British and Canadian Medical Associations at Winnipeg in 1930. It bears the following inscription:

WILLIAM HARVEY SMITH, M.D., C.M., LL.D.
1868-1940
President, British and Canadian Medical Associations
1930-31.
Professor of Ophthalmology
Founder of the Medical Arts Building
"A Vision and its Achievement"

Presented by his family, March, 1942

Dr. H. E. Robinson, Assistant-chief of Swift Company, Chicago, addressed 500 women in the Royal Alexandra Hotel, Winnipeg, on April 10th on "Nutrition in War". Victory, he said, could only be achieved by the vigour and vitality of the people. Industry and the armed forces are continually being robbed because of poor nutrition.

Mrs. Beth Bailey McLean, known professionally as Martha Logan, also spoke. She said malnutrition was not confined to lower income groups, but that some of the wealthiest families suffered because their diets were lacking in essential food stuffs.

Mr. Peter Lowe, executive secretary of the Winnipeg Foundation, has recently explained the relation of the Foundation to the Winnipeg Clinic building, now under construction. He stated that the Clinic building is being erected and financed by the medical doctors responsible for the promotion of the clinic. While matters are now only in the discussion stage, the promoters propose that after completion of the building it be donated to the Foundation subject to certain encumbrances for which the Foundation would be in no way responsible, and the building leased to the clinic at a rent sufficient to pay all carrying charges and retire the encumbrances in a reasonable number of years. When the building is clear of encumbrance, it is proposed that the net income after carrying charges be devoted to medical research, and the fund so created be administered by the Foundation.

A medical rink, composed of Dr. A. Guttman, lead; Mr. Burn, 2nd; Dr. F. G. McGuinness, 3rd; and Dr. I. O. Fryer, skip, won the University Bonspiel. At the annual dinner of the Manitoba University Alumni on April 11th, Dr. Fryer received the Dr. A. B. Alexander Memorial

Trophy which was given about four years ago by the Faculty of Medicine as first prize in the University competition.

Capt. T. Benaron, R.C.A.M.C., who left Canada with No. 4 Field Ambulance, First Division, has returned to Winnipeg. On the expiration of his leave he may be used on instructional duty.

President Sidney E. Smith, Hon. Ivan Schultz, minister of Education and R. F. Thompson, Ottawa, Dominion director of Youth Training, discussed at the Legislative building on April 11th the question of financial aid to medical students. Such aid is needed to enable medical students of the second and third years to carry on their course during the summer so that they may graduate as quickly as possible. There is an urgent demand for doctors in the Dominion's armed forces.

Mr. Thompson outlined the Dominion proposal to provide $300.00 for each student, the cost to be shared equally between the Dominion and the province.

It is understood that the Legislative Council of Manitoba has recommended setting aside $5,000.00 to $8,000.00 for this purpose.

An act to incorporate Manitoba Medical Service was passed at the recent session of the Legislative Assembly. It is hoped to have this scheme come into operation in September. ROSS MITCHELL

New Brunswick

Dr. T. C. Routley, General Secretary of the Canadian Medical Association, recently visited the Eastern Provinces. While in New Brunswick he attended a meeting of the New Brunswick Society's Executive Committee. At this meeting Dr. Routley brought the local members of the division up to date on the discussion of the proposed legislation covering Health Insurance, as well as advising on many other aspects of the medical economics. There was a full attendance of executive members and this meeting created something of a record by lasting well into the early hours of the following morning.

Canadian Army Orders recently notified that Major H. B. Bustin, Saint John, had been promoted to the rank of Lt.-Colonel, to command the Second Convalescent Depot.

Wing-Commander F. C. Cheeseman, of St. George, N.B., has been appointed Chief Medical Officer, Western Air Command, with headquarters at Victoria, B.C. Another New Brunswick physician, Wing-Commander A. A. G. Corbet holds a similar rank in the Eastern Air Command at Halifax, N.S.

The regular meeting of the Saint John Medical Society was held on March 10th and the full time of the meeting was utilized to discuss the Canadian Medical Association questionnaire on Health Insurance. Similar meetings were held by all district societies throughout the province. A. STANLEY KIRKLAND

Nova Scotia

". . . The Nova Scotia Medical Board may, in its discretion, for the purposes of augmenting the supply of physicians available to His Majesty's services, accept as sufficient for the duration of the present war a course of medical study of less than five years' duration conducted by a recognized medical school within the Dominion of Canada." Sponsored by Health Minister F. R. Davis, this bill, amending the Nova Scotia Medical Act, culminated a period of brief but intense discussion throughout Dalhousie medical school and the hospitals of the province. Dalhousie classes will resume after a short May recess and the class of '43 will graduate in January.

Dr. J. A. Donahoe has opened an office in Shelburne, N.S. Dr. Donahoe was practising in Barrington Passage.

The Halifax Medical Society has put into effect their long-discussed plan for the elimination of routine evening office hours, with the co-operation of a large majority of the profession. Except by that inevitable group of the public which habitually misreads notices and concluded that tne doctor was going out of business daily, from six p.m. till sun-up, the plan has been well received.

Dr. Charles B. Smith, of Goldboro, is opening an office in Pictou.

Dr. Thomas A. Lebbetter, of Yarmouth, is now on active service with the R.C.A.M.C. His practice has been taken over by Dr. W. C. O'Brien, of Wedgeport.

Dr. J. D. Densmore, Port Clyde, has set up practice in Shelburne.

The Eastern Kings Memorial Hospital, Wolfville, announces proudly that it has wiped out the debt incurred at its beginnings twelve years ago. Dr. L. B. Chase, Port Williams, and Dr. P. S. Cochrane, of Wolfville, have been appointed trustees. ARTHUR L. MURPHY

Ontario

The eleventh annual meeting of the Niagara Peninsula Sanatorium was held on March 27th, at which the Ontario Minister of Health, the President of the Canadian Tuberculosis Association, and the Director of the Tuberculosis Division of the Ontario Department of Health were present. Dr. C. G. Shaver, the Superintendent, reported an increased demand for beds, which appears to have been due to the facilities offered by the Sanatorium for examination of all those who have been in contact with tuberculosis and for those with symptoms of chest trouble. The Occupational Therapy Department was especially mentioned by Dr. Shaver as being most valuable last year. This work was financed largely by the Lions' Club of the District. The Sanatorium keeps a complete file of new cases of tuberculosis registered in the district. All those not requiring active treatment are kept under observation. The annual sale of Christmas seals netted a little under $10,000, an increase of $2,000 over last year.

Group Captain J. W. Tice, Toronto (1921), has been appointed Deputy Director of Medical Services in the R.C.A.F. Prior to the outbreak of war, he was, for some time, Medical Officer of the 119th Bomber Reconnaissance Squadron, a unit of the Auxiliary Air Force.

Dr. G. F. Cliff has left his practice at Kingston to take an appointment as physician to the Burwash Industrial Farm.

Lt.-Col. N. M. Hallett, Queen's '14, is announced as now in command of No. 7 Canadian General Hospital.

The Government of the Province of Ontario has made an arrangement with the Ontario Medical Association, effective April 1st, 1942, whereby the present medical relief plan will be enlarged to include all old age pensioners, blind pensioners, mothers' allowance cases and cases participating in the allowances of the latter. The organization, direction, and management of the plan are to be carried out by the Ontario Medical Association. It is estimated by the Province that approximately $750,000 per year will be the cost of this medical service.

The City of Guelph is extending its public health nursing service. Dr. W. A. Proud, the Medical Officer of Health, announces the inauguration of a new plan. Up to the present time, two full time nurses and one

part time nurse have been doing public health work in the city. The new plan calls for the division of the city into four districts each of which will have one full-time nurse. These nurses will assist in the clinics for babies, immunization clinics, mental health, special clinics, and tuberculosis clinics.

Dr. Arthur W. M. Ellis, B.A. (1906), M.B. (1908), F.R.C.P., who has retired as Professor of Medicine at the London Hospital, has been appointed by the Medical Research Council of Great Britain to a whole-time position on its scientific staff as Director of Research in Industrial Medicine. His first work will be directed to problems of industrial toxicology which are of special importance during the war.

The annual meeting of the Medical Alumni Association of the University of Toronto will be held in Private Dining Room No. 7, Royal York Hotel, Toronto, on Thursday, May 28th, at 12.00 noon.

Capt. J. H. Grove, recently in practice at Paisley, Ont., has been transferred from 15th Canadian Light Field Ambulance to the Halifax Military Hospital staff.

Capt. W. Fowler, formerly of Erin, Ont., has been transferred from Pictou Highlanders to Halifax Military Hospital staff.

Major E. A. Clark, who was formerly in Department of Public Health, Ont., has reached Headquarters, Military District No. 6, from Petawawa.

Capt. H. N. Lackner has been transferred to Headquarters, Military District No. 6, from 24th Canadian Field Ambulance. He formerly practised in Kitchener, Ont.

Capt. W. T. Mustard has arrived recently in Charlottetown, P.E.I.

F/O Ormsby—No. 31 Personnel Depot, R.A.F., Moncton, N.B. He is a graduate in Arts, U. of B.C. (1932) and a graduate in medicine, U. of Alberta (1937) and was in general practice at Magog, Quebec, before joining the Service. He was registered in Ontario, prior to joining the Service.

F/L G. R. Nodwell—Senior Medical Officer at No. 2 Air Navigation School, Pennfield Ridge, N.B. He graduated from the U. of T. in 1922 and practised both in Grand Valley, Ont. and in Toronto. During World War 1 he served for 1½ years in the Canadian Engineers as a Signaller and for one year in the Royal Naval Air Service, as a pilot. From 1923-1927 he served in the R.A.F. Medical Service, including 3 years in the Middle East and 11 months in the Main Hospital at Halton, England, and one month at the Central Medical Board, Air Ministry, London, England.

F/L R. G. McGugan—Medical Officer in charge of No. 16 Recruiting Centre, Halifax, N.S. He is a graduate of the U. of Western Ontario (1939) and interned at the Victoria Hospital, London, Ont.

F/L H. L. Savage—R.C.A.F. Station, Dartmouth, N.S. He is a graduate of the U. of Western Ontario (1929) and practised in Toronto, Ont.

F/L B. M. Morrow—R.C.A.F. Station, Dartmouth. He is a graduate of the U. of T. (1940).

F/L G. D. Caldbick—Medical Officer in charge at No. 5 Equipment Depot, Moncton, N.B. He is a graduate of Queen's University (1937) and was in practice at South Porcupine, Ont.

W/C L. H. Leggett—Senior Medical Officer, R.C.A.F. Station, Gander, Nfld. He is a graduate of Queen's University (1924), F.R.C.S. Edinburgh) in 1929, F.R.C.S. (C) in 1930. He was in surgical practice at Guelph, Ont., prior to the war.

F/L D. C. Graham—R.C.A.F. Station, Gander. He was a graduate of U. of T. (1938) and interned at the Toronto General Hospital 1938-39—London County Council (England) in 1939.

S/L. D. H. Hubbs—R.C.A.F. Station, Gander. He is a graduate of Queen's University—Guy's Hospital, London, England (1923), Hon. Surgeon at Barnsby Beckett Hospital (1924-30), Surgeon Prob. R.N.V.R. (1917-19). He practised in London, England, till 1939 and was Hon. Physician to the Hospital for Women, Stoke Newington.

F/L J. A. Mahoney—Command Hygiene Officer, Eastern Air Command. He is a graduate of U. of T. (1933), D.P.H. (Tor.) 1941.

F/L C. W. Forsyth—Medical Officer in charge No. 1 Port Transit Unit, Halifax. He is a graduate of Queen's University (1938) and interned at the Kingston General Hospital and the Ottawa Civic Hospital and practised at Viceroy, Sask.

J. H. ELLIOTT

Quebec

L'hôpital Notre-Dame de Montréal a inauguré un Centre anticancéreux et il en a confié la direction au Dr L. C. Simard, professeur agrégé d'anatomie pathologique et chef-adjoint du laboratoire d'anatomie pathologique de l'hôpital Notre-Dame. Une consultation externe et une revue des malades hospitalisés ont lieu une fois par semaine. Le Comité de direction de ce Centre se compose, en plus du Dr L. C. Simard, des docteurs D. Léonard, J. U. Gariépy et A. deGuise. Un souscomité comprend les Drs L. Gérin-Lajoie, A. Marin, P. Panneton, D. Marion, R. Amyot, P. Bourgeois, J. Tremblay et R. Dufresne. Ce Centre a pour but principal le dépistage précoce du cancer. Déjà 77 malades ont été observés.

Les médecins de l'hôpital Notre-Dame ont élu aux élections du 20 mars dernier l'exécutif suivant: *Président*, Dr Jean Saucier; *vice-président*, Dr C. E. Hébert; *secrétaire*, Dr Raymond Simard; *bibliothécaire*, Dr. Emile Ménard. Les Drs B. G. Bourgeois, A. Magnan et D. Marion représenteront le Bureau Médical au Bureau d'Administration.

Du 1ier au 6 juin, 1942, aura lieu à l'hôpital Ste-Justine la Semaine de Pédiatrie annuelle. La direction de cette semaine scientifique a été confiée au Dr. Gaston Lapierre, professeur de pédiatrie à l'Université de Montréal. Le droit d'inscription est de $3. et les inscriptions sont limitées à une trentaine. Le programme de ce cours de perfectionnement sera annoncé ultérieurement.

JEAN SAUCIER

Saskatchewan

In 1938 some 44 cases of encephalomyelitis were reported by F. C. Middleton, M.D., of the Department of Health of Saskatchewan. These cases developed in the Regina, Weyburn and Midale districts particularly.

In 1941 the disease again made its appearance among human beings, in young children, about the last week of July, and these cases were brought to Regina for hospitalization. There had been one case in May, one in June, and four in July. Then in August 453 cases, or 83.6 per cent of the cases occurred. In September, 74, or 13.4 per cent, of the cases occurred, in October, 8, and in November, 1. The greatest number occurred in the week ending August 23rd, when 180 cases, or 33 per cent of the total cases occurred. The real epidemic lasted about five weeks—from August 9th to September 13th. Of the 543 cases reported in 1941, 359 were male

and 180 female. There were 45 cases under one year of age. In the age-group, one year to six years, there were 38 cases. In the age-group, six years to twenty years, there were 113 cases. In the age-group, twenty years to fifty years, there were 173 cases. Over fifty years there were 173 cases. The total number of deaths was 44.

The areas affected were the South-East and Central parts of the Province, with an area around Yorkton reporting several cases. There was very little in the northern part of the province; in fact if a line were drawn east and west through Saskatoon there were only 21 cases north of this line. Of the cities, Regina reported 87; Moose Jaw 62; Weyburn 22; Yorkton 7; Saskatoon 7; and Swift Current 3. There were very few instances where there was more than one case in a family.

LILLIAN A. CHASE

General

Drug Monoply Seen as Threat to Control of Malaria.—The fight against malaria, a killing and disabling disease affecting several million residents of the United States, now faces a double handicap, the staff of *Medical Care* warns in an article entitled "Monopoly over Malaria?" published in the spring issue of the quarterly journal.

The Japanese conquest of Java cut off from the United Nations more than 90 per cent of the world supply of cinchona bark, from which quinine is manufactured. Although existing stocks in the United States should last for slightly more than two years, *Medical Care* foresees heavier demands for army and civilian needs in the south and for troops in malarial regions abroad.

Two synthetic substitutes for quinine are produced, and the patents for these processes present the second obstacle. As in the case of synthetic rubber, the great German chemical trust—I. G. Farbenindustrie—has exercised tight control over atabrine and plasmochin, the coal tar derivatives that constitute with quinine the only known specifics for treatment of malaria.

The I.G.F. licensed the Sterling Products Company to manufacture atabrine and plasmochin for sale in the United States. An anti-trust action by the Department of Justice forced Sterling to break off its relations with the German trust last September, but so far as *Medical Care* has been able to learn, the American firm has not permitted any other manufacturer to use its patents.

"All things considered, the shortage of quinine would probably not be a threat of major proportions, provided the synthetics were available in sufficient amounts at reasonable cost," the article comments. But evidence assembled by the staff of *Medical Care* points to the operations of an international cartel in limiting production and maintaining a high price for both the natural drug and its substitutes. Recently the president of Sterling Products announced that the production of atabrine would be increased but nothing was said about the price.

Under existing federal war powers, and with no loss to national health, quinine could be eliminated from so-called hair tonics, from compounds such as certain "laxative tablets" sold for colds, and possibly from other non-essential remedies sold for self-medication. Such action should be taken at once by the War Production Board. Thus the shortage of quinine could be helped somewhat.

Suggesting that the patent laws be amended to provide fair returns for discoverers and manufacturers of new drugs but to prevent restricted production and prices beyond the reach of many patients, the article concludes:

"The present situation of quinine and its substitutes makes clear that it is not in the public interest to have the ownership and control of a medical discovery of wide public importance remain irretrievably for 17 years in the hands of individuals or agencies which can exploit them for their private advantage, despite a national emergency."

[*N.B.*—Hearings before a Committee of the Senate are announced for April 13th, on the O'Mahoney-Bone-La Follette bill, recently introduced in the Senate. This bill provides for a system of licenses open to all, to be established for any patented process upon a declaration by the President that such action is essential to the national defense.]

Office of Civilian Defense.—President Roosevelt has appointed Dr. George Baehr, Chief Medical Officer of the Office of Civilian Defense, to be a member of the Health and Medical Committee of the Office of Defense Health and Welfare Services. Dr. Irvin Abell, Louisville, Kentucky, chairman of the Committee on Medical Preparedness of the American Medical Association, is chairman of the Health and Medical Committee and other members are the Surgeon-General of the United States Army, Major-General James C. Magee; the Surgeon-General of the United States Navy, Rear Admiral Ross T. McIntire; the Surgeon General of the United States Public Health Service, Dr. Thomas Parran, and the chairman of the Division of Medical Sciences, National Research Council, Dr. Lewis W. Weed, Baltimore. The Office of Defense Health and Welfare Services is a part of the Office for Emergency Management which in turn is part of the Executive Office of the President. The director of the O.D.H.W.S. is Paul V. McNutt, who is also Federal Security Administrator.

The Medical Library Association will hold its 44th annual meeting in New Orleans, May 7 to 9, 1942. The hosts are the Rudolph Matas Medical Library of Tulane University, the Orleans Parish Medical Society Library and the Agramonte Memorial Library of Louisiana State University Medical Centre. Hotel headquarters will be the Jung Hotel. The program will feature tropical medicine and southern medical history. The President of the Association, Miss Mary Louise Marshall, will preside.

Finney-Howell Research Foundation, Inc.—At the meeting of the Board of Directors of this Foundation held in February, eight fellowships were awarded for the period of one year.

Applications for next year must be in the hands of the Secretary of the Foundation by January 1, 1943.

The Koch "Cancer Cure".—We reprint the following from the *J. Am. M. Ass.*, 1942, **118:** 1373.

"*The Journal* has repeatedly called attention to the promotion of products by the Koch Laboratories. Again and again it has urged federal agencies to display an interest in the matter. The Detroit *Free Press* for Sunday, April 5th, notes that 'Federal Agents took action Saturday against Koch Laboratories, Inc., 8181 E. Jefferson, by arresting Louis Koch, the concern's secretary treasurer, in Detroit and Dr. William F. Koch, president, in Delray Beach, Fla.' It notes that the Kochs 'will face charges of violating the Federal Food, Drug and Cosmetic Law on 11 specific charges.' The *Free Press* reports that Dr. Koch was arrested on a removal warrant and was released on a $5,000 bond pending a hearing in Detroit on April 15th. Assistant United States Attorney John C. Ray is quoted as saying with regard to the concern's synthetic antitoxin 'A thimblefull of this liquid sells for $25 to practitioners and they get as much as $300 from patients. Chemical analysis shows that the dilution is so infinitesimal that it would be like dumping a cocktail in the Detroit River at the foot of Woodward and expecting to get a kick out of the water going over Niagara Falls.' The *Free Press* reports that 'Doctors said it was something like a molecule, so tiny that it can't be seen, to every 300,000,000 gallons of water.' The United States Attorney, it is reported, said that the Koch brothers were arrested after a prolonged investigation. The *Free Press* called attention to the fact that 'Dr. Koch was named defendant in a malpractice suit in Detroit in 1934 and a jury returned a $25,000 verdict against him while he was head of the Koch Cancer Foundation. Later the

verdict was held excessive and in a second trial a jury reduced the amount to $5,500. The suit was started by Alfred A. Fortner, who told the jury Dr. Koch diagnosed an infected knee as a cancer.' The procedure of diagnosing as cancer a condition which is not malignant, and then expediting an effective treatment, is old in cancer quackery. For a number of years Koch has issued promotional material which contained reports of an unscientific character with regard to cases in which his preparations had been employed. More recently he circularized physicians with regard to what he refers to as '1:4 Benzoquinone,' claiming, without the slightest bit of scientific reference . . . that it is the effective ingredient in the sulfonamide preparations. Besides Koch there still remain a few other charlatans in the field of cancer who merit federal attention. Perhaps the Koch incident will seem to them a 'handwriting on the wall'."

Book Reviews

A Manual of the Treatment of Fractures. J. A. Caldwell. 150 pp., illust. $3.50. C. C. Thomas, Springfield, Ill., 1941.

The author's object has been to outline the treatment of fractures as approved by recognized authorities. He has selected the most generally used methods, avoided controversial issues, and covered the field thoroughly. He opens with three chapters on fractures in general, anæsthetics, compound fractures, the use of x-ray, and infection, acute and chronic. He then proceeds to cover systematically the various types of fractures one meets in the different bones of the body. The closing chapters deal with delayed union, non-union, operative treatment, and complications. Finally the principles of first-aid are laid down, briefly but to the point.

Certain features of the book warrant special mention. The numerous sketches are excellent. They leave no doubt in the mind of the reader what is meant. There is enough information given in each case to work on, but for details of treatment reference is made to well known volumes on the subject, or to readily available journals. The section on fractures about the ankle is especially good. Perhaps too free use is made of names rather than a description, such as the "Schanz dressing", or the "Parham Martin band".

The book is brief, practical, the important points are emphasized, and it is well written. It is to be highly commended to students, practitioners, and especially interns. Anybody interested in teaching fractures should have one.

Pre-eclamptic and Eclamptic Toxæmia of Pregnancy. L. Dexter and S. Weiss. 398 pp. $5.00. Little, Brown & Co., Boston, 1941.

This monograph is a timely contribution to an important obstetrical problem. The authors postulate the hypothesis that "the placenta is considered to be the primary seat of the disorder", although multiple factors are operative in the production of water retention, hypertension, albuminuria and convulsions. In various chapters they give the result of clinical and experimental investigation on the pathogenesis of toxæmia, testing such theories as the relationship of the pressor fraction of the posterior pituitary, the presence of a pressor substance in the placenta, the effect of the injection of hormones, and the effect of fetal death *in utero*.

An important distinction is made between hypertension IN pregnancy (*i.e.*, the prepregnant hypertensive patient) and hypertension OF pregnancy with a toxæmic basis; also between generalized œdema in pregnancy and œdema with other toxic manifestations.

Chapters on the toxic effects of posterior pituitary extracts in pregnant women, and neonatal blood pressure of infants of toxæmic mothers are most interesting and informative. The final chapter is a comprehensive discussion of the various methods of treatment, with a detailed evaluation of the drugs used.

This should prove a most useful reference book, especially as the literature on pre-eclampsia and eclampsia is thoroughly reviewed in it. Before going into a second printing, the errors of repeatedly using "proprionate" for propionate and "tryamine" for tyramine should be corrected, especially as these inaccuracies are carried over into the bibliography.

Operative Surgery and Abdominal Surgery. Edited by F. W. Bancroft. 1102 pp., illust. $10.00. University of Toronto Press, 1941.

This is the first of a series of volumes dealing with the whole sphere of operative surgery. There are thirty-four outstanding contributors dealing with anæsthesia, pre- and post-operative therapy, blood transfusions, surgical technique and the many aspects of abdominal surgery.

Of interest to Canadians are sections on abdominal incisions by Dr. Fraser Gurd of Montreal, congenital pyloric stenosis and trauma of the duodenum by Dr. D. E. Robertson, of Toronto, and spinal anæsthesia by Dr. H. J. Shields, of Toronto.

It is impossible in the ordinary review to indicate more than the scope of a complete volume such as this. Suffice it to say that it will be of especial value to the general abdominal surgeon as a reference in bringing the various subjects up to date. For those interested in the full field of surgery, the set of volumes when published, should provide a fine reference. The work is beautifully bound, printed, and illustrated.

Handbook of Communicable Diseases. (Manuel de maladies transmissibles). F. H. Top. 682 pp., illust. $8.75. McAinsh, Toronto, 1941.

In the first part of this very useful book the author treats of general considerations applicable to transmissible diseases. Infection and immunity, epidemiology, the rules concerning the control of transmissible diseases, the specific prevention of certain of these maladies, sera and serological reactions, the treatment of diseases transmissible in the hospital as well as in the home, are among the chapters which will furnish clear and precise instruction to the reader. The second part is devoted to the study of transmissible infectious diseases which the author classes according to their ports of entry — respiratory, gastro-intestinal, mucous, cutaneous. This method of procedure appears to us to be new and worthy of being emphasized.

There are numerous illustrations in black and white and several plates in colours which are more demonstrative. The appendix contains numerous statistical tables upon the different diseases studied and their complications which are illustrative in the course of these same diseases.

Finally there is a glossary. It is regrettable that the author has not thought fit to devote a larger part of his work to bacteriology and to bacteriological technique. In spite of this lack however Top's book remains one of those which every physician ought to keep constantly beside him.

Elimination Diets and the Patient's Allergies. A. H. Rowe. 264 pp. $3.45. Lea & Febiger, Phila., 1941.

The usefulness of such a book as this is very evident to anyone who had to deal with allergic cases; and there is no lack of these. Skin tests have been found to be only of limited value in connection with food allergy. Actually the proof of the effects of the pudding *is* in the eating. But unless one has definite carefully worked out diets it is difficult to advise patients how to observe the effects of given foods. This is where Dr. Rowe's book is of great help. It can be recommended to those interested in this type of case.

Medical Diseases of War. A. Hurst. 2nd ed., 426 pp., illust. $5.50. Macmillan, Toronto, 1941.

In the light of experiences, and the literature of 1940, this book has been thoroughly revised and supplemented. Chapters have been added on amœbic dysentery, malaria, and on digestive disorders. The first part of the book deals with the functional disorders so commonly seen in the daily sick parade, and ends with an excellent chapter by the late T. A. Ross, on "Anxiety Neuroses of War". The chapter by H. W. Barber on "Skin Diseases in War" is well written and will prove of great value to medical officers who for the first time are thrown against the skin disorders so common in war—scabies, pediculosis, and impetigo.

As was the first, so should this edition be recommended the medical officers of our army, navy and air force.

Gynæcology and Female Endocrinology. E. Novak, 605 pp., illust. $10.00. Little, Brown & Co., Boston, 1941.

For the student of gynæcology who wishes to get below the surface to the fundamentals of physiology and pathology this is a very fine book. Pre-eminently, as its title hints, it reveals the author's longstanding preoccupation with endocrines, and this part of the book is extremely well done and—on the whole—with discrimination. So is the pathology. If some of the concepts on displacements of the uterus show no advance on older teachings and no impact of later enlightenments in the realm of etiology, the tumour section is immediately up to the minute and first rate.

Perhaps the section on ectopic gestation is one of the weakest, but it is one of the weakest in so many books that perhaps one should not cavil. For instance, quite a long paragraph is given up to etiology, and certain conditions are laid down as causes, the same conditions that have been carried from textbook to textbook over many years. But isn't it the truth that we really don't know what causes ectopic gestation in the vast majority of cases? Wouldn't it be better for textbooks to start their paragraph on etiology with that statement and then, if they feel the need to, state that certain physical causes which have been held in the past should be regarded with the greatest scepticism?

In the matter of treatment tremendous space and emphasis is given to the later endocrinological therapy. The author states the case very fairly for the endocrines, making no claims for them that are not more or less substantiated. But this side of his therapy is treated at so much greater length and in so much greater detail than any other aspect—unless it be the use of pessaries—that one comes away from the book with the impression that there is very little else to gynæcological treatment these days than the exhibition of glands.

These faults, however, are small faults in a book that every doctor practising gynæcology would do well to have on his shelves.

Clinical Hæmatology. M. M. Wintrobe. 792 pp., illust. $11.50. Macmillan, Toronto, 1942.

While a number of good texts in hæmatology have appeared lately, this volume deserves a wider reading because of its systematic and orderly presentation. It is written in a clear and pleasant style, stressing the fundamental knowledge and application of the subject. The author has wisely eliminated a complete section of technical methods, prefering to give them clearly in the different chapters of which they form a logical part. Though colour plates are few, the profusion of black and white illustrations are clear and instructive.

The book is divided into the following eighteen chapters: The Origin and Development of the Cells of the Blood in the Embryo, Infant, and Adult; The Erythrocyte; The Leukocytes; Blood Platelets and Coagulation; The Blood as a Whole; The Principles and Technique of Blood Examination; Anæmia: General Considerations and Treatment; Pernicious Anæmia and Related Macrocytic Anæmias; The Normocytic Anæmias; Normocytic Anæmias Continued; Hæmolytic Anæmias; Hypochromic Microcytic (Iron Deficiency) Anæmia; Anæmia in Infancy and Childhood; Polycythæmia; The Purpuras; Hæmophilia and Other Hæmorrhagic Disorders; Leukæmia; Tumours and Tumour-Like Conditions Involving the Blood-Forming Organs; Agranulocytosis and Infectious Mononucleosis. At the end of each chapter, a complete bibliography follows.

The book is recommended as a sound and useful textbook in its field.

Clinical Roentgenology of Pregnancy, W. Snow. 178 pp., illust. $4.50. C. C. Thomas, Springfield, 1942.

The various technical procedures for the x-ray examinations of the maternal pelvis, fetal skeleton and the soft parts of interest in pregnancy are presented clearly and graphically in this monograph. Naturally, greater prominence is given to the author's own methods to which he has devoted many years of study. Dr. Snow has shown effectively the contrast between the gross quantities of radiation used by the experimentalists and the minimal amount required for these important diagnostic exposures. This should dispel the fears of possible damage to mother or fetus which unfortunately have been over emphasized by alarmists.

The format and typography, especially the excellent illustrations, are characteristic of the publisher's desire to produce the best in medical books, and the result of his long study of the reproduction of roentgenograms.

This volume should prove to be a valuable technical and reference manual for the obstetrician and the roentgenologist.

Allergy in Clinical Practice. Staff Members of the Cleveland Clinic. 354 pp., illust. $6.00. Lippincott, Montreal, 1941.

The avowed purpose of this book is "to illustrate the rôle of allergy in the production of disease in man". The writers emphasize that allergy is an important prime cause of disease and of symptoms, ranking with the few known prime causes such as infection, new growth, endocrine disorder and the others. Emphasis is laid on the great variety of signs and symptoms that may sometimes be produced by allergy. This emphasis is not overdone, for the reader is properly cautioned, when necessary, that allergy may be only one of several prime causes that might produce the illness. Moreover such emphasis is desirable, for allergy as a prime cause receives little attention in most medical schools, falling somewhere in the space between the Department of Pathology and the Department of Physiology and lying there unnoticed save for certain timid and distrustful approaches by the Department of Medicine.

"Each specialist in a field in which allergy is applicable has evaluated this principle in his field."

In each chapter the same plan is followed. The subject is first discussed, then case reports are given which demonstrate well the making of the diagnosis and the case management. This method has its drawbacks. The discussion of the subject is of necessity and with certain exceptions rather elementary and superficial, so much space being given to case reports; and no statistical studies are reported, so that little perspective is possible of the results obtainable by the methods used. However some failures are described among the successes claimed.

The book will definitely help the reader to appreciate allergy as a prime cause of disease and of symptoms. This is the avowed purpose of the book. It will not greatly help him to treat, himself, many of his allergic patients.

The Modern Treatment of Syphilis. J. E. Moore. 2nd ed., 674 pp. $7.00. C. C. Thomas, Springfield, 1941.

When this important monograph first appeared eight years ago the present reviewer was particularly impressed by the completeness with which the subject was presented. The last word in syphilotherapy has not yet

been said, but after a careful examination of this last edition we feel that nothing of any significance has appeared which has not been given thorough consideration in its pages.

New methods in the treatment of syphilis have been occupying much space in professional literature in recent years, and less desirably in popular periodical literature. No little confusion and amount of false hopes have resulted not only in lay but in professional minds. Among these innovations are the use of mapharsen, the oral use of bismuth, the newer methods of mechanical fever therapy and massive arsenotherapy (intravenous drip). These subjects receive the most enlightening and critical consideration.

We should especially like to draw attention to the chapter dealing with General Considerations in the Treatment of Early Syphilis, because this is a matter whose importance is underrated and far too frequently neglected in the preoccupation with chemotherapy at this stage. This chapter should be read and re-read from time to time by everyone presuming to treat syphilis. While the writer's style does not strain after the picturesque and epigrammatic many pithy statements occur; it is probably not original but the injunction on page 545—Treat the Patient *NOT* His Blood Test—well deserves the box in which it is placed. A number of figures illustrating charts and mechanical fever apparatus, as well as many statistical tables greatly add to the value of the book for quick reference purposes.

The reviewer maintains his conviction after reading the first edition, sustained by eight years of constant reference to it, that this is a truly great work and one indispensable to anyone dealing with syphilis.

The Value of Health to a City; two lectures delivered in 1873. Max von Petenkofer. Tr. from the German by H. E. Sigerist. 52 pp. $1.00. Johns Hopkins Press, Baltimore, 1941.

Max von Petenkofer lived at a time when health conditions were bad. A physician, he was not only interested in his chosen field, but he had in addition a broad social interest in the welfare of his fellowmen. Much of this interest was inspired by the success which had been attained in England and which he believed could be duplicated in his beloved Munich.

Not only are these two lectures valuable historical documents but they also provide an example of a sound approach to the public in health matters.

The introduction by Dr. Sigerist gives an interesting, clear and concise account of the man who "is one of the most colourful personalities in the history of public health".

The Microbe's Challenge. F. Eberson. 354 pp. $3.50. J. Cattell Press, Lancaster, 1941.

A very satisfactory book, well written, and filled with interesting and unusual information. It would be impossible to know how much a layman could appreciate many of the detailed and technical accounts covering a wide range of bacteriological subjects, but such a reader can feel assured that the facts have not been emasculated by Dr. Eberson's simplification of the scientific language, and that here he will find a thrilling story of the history, progress, difficulties and future possibilities of bacteriology, immunity and preventive medicine. It is an excellent book for the busy practitioner who wishes to know some of the real problems of the bacteriologist. The reader may not agree with all the author's views, but these views are well worth attention. There is perhaps too great a tendency to predict hoped for results in fields in which the facts are still not satisfactorily correlated, *i.e.*, too many things are "just around the corner". Dr. Eberson does not attempt to cover the whole subject, but rather he tells in a somewhat discursive way about parts of the work with which he has come in contact during his varied experience. The plague as an example of microbes running amuck, the discussions of viruses—"the border land" and its "riddles", the chemistry and behaviour of bacteria, are all filled with vital interest and illustrate both the failures and the successes of the past. Modern chemotherapy, one of the most direct responses to the microbe's challenge, is unfortunately not mentioned. The finding of the poliomyelitis virus in fæces and sewage came too late to be incorporated but would have modified his discussion on the subject. Taking it all in all, however, The Microbe's Challenge can be recommended to professional and non-professional readers as the best popular book on bacteriology which the reviewer has seen, incomparably more worth while, for example, than De Kruif's "Microbe Hunters".

The Doctors Mayo. H. Clapesattle. 822 pp., illust. $4.50. Wm. Collins Sons, Toronto, 1941.

Here is the story of the great family of American medicine. Through its early pages the reader comes to appreciate, as perhaps never before, the part played by the "old doctor", William Mayo, in the growth of "the Mayos". His, first, was the broad vision, the will to work, the driving ambition, so apparent throughout the lives of Will and Charlie Mayo. But as the tale grows his rôle shrinks before the vast accomplishments of his sons. The Mayos are pictured against the broad background of American medicine through the period of its greatest development. Beyond all this, as a backdrop, is the whole growth, industrial and social, of the United States through the last decade of the nineteenth century up to the present day.

Helen Clapesattle has made her book an accurate, painstaking chronicle of the Mayos' lives. Working under the authority of the University of Minnesota, to whom the Mayos had entrusted their biographical responsibilities, with all of their records at her disposal, with the opportunity to gather more material and anecdote at first hand, she has written a competent biography. That it is not a great biography is perhaps due to the very volume of material through which she must have laboured. Often the brothers fade against the panorama of the background, only in the anecdotes revealing the strength and warmth of their characters. The book is a record, not a study. Yet to the elders of our profession it will give vast material to add to reminiscence; to the younger men the Mayos must serve as an inspiration to greater effort in our art.

Behind the Mask of Medicine. M. Atkinson. 348 pp. $3.00. C. Scribner's Sons, New York, 1941.

It is not quite clear from the author's preface or from the publishers' notices whether this book is intended primarily for public consumption or for professional edification. The title, however, would appear to have been designed to tempt lay curiosity, and because it does suggest the revelation of secrets, perhaps spicy secrets, it may well attract readers. It is interesting to reflect that such a title applied to other professions (except perhaps theology) would probably leave the public unmoved. Behind the Mask of Engineering or Behind the Mask of Architecture or Dentistry would not cause many people to pay $3.00 (the price of this book). But medicine does appear to hold a peculiar fascination for the public which medical men in their preoccupation often forget.

From the standpoint of the physician there is not much that is startling in this book. The non-medical reader may be entertained and somewhat educated, but perhaps a little disappointed at the degree of unmasking. No grisly secrets are revealed. Some space is given to medical history and chapters are devoted to the processes and difficulties of diagnosis and prognosis. A good deal is said about the rise in specialism and the decline in the position of the general practitioner, all of which is pretty generally known. Perhaps the best chapters deal with the plight of hospitals and the future of medicine, particularly with regard to the socialization of medicine. The author was educated in England and practised there for a number of years. He now practises in New York City and has had a good experience with which to compare medicine in England and the United States.

In a number of instances it appears to the reviewer that the author has fallen into the error which he himself cautions against when speaking of popular health education: "Matters such as this are for the meetings of experts, not for the market place."

Food and Beverage Analyses. M. A. Bridges and M. R. Mattice. 2nd ed., 335 pp. $4.60. Macmillan, Toronto, 1942.

No subject is attracting more attention in both the medical and the lay mind than diet. In no case is there greater need for clear and authoritative statements. This book now in its second edition adequately fills these needs. It includes quantities of fresh data on the acidity of foods, their fibre content, the occurrence of such minerals as sulphur, bromine, calcium and other substances such as purins, available carbohydrates, and ionizable iron. The table on nutritive and caloric values of foods is a volume in itself for the amount of information it contains. Who ever would have thought there was such a vast variety of cheese in the world? The sections on vitamins are concise and thorough.

The book may be highly recommended.

Psychosurgery. W. Freeman and J. W. Watts. 337 pp., illust. $6.00. C. C. Thomas, Springfield, 1942.

The authors are to be congratulated on providing this first edition of a book dealing with an entirely new treatment for certain mental disorders. The therapy described was introduced to this country by the authors six years ago and is called "prefrontal lobotomy". It consists of a surgical operation designed to destroy certain of the conducting fibres of the prefrontal lobes of the brain.

The book is well prepared and interesting to read, quite apart from the actual surgical technique recommended, in that the whole subject of the function of the frontal lobes is well reviewed. The authors are fair and frank in describing the complications and results in their cases and their investigations have been thorough.

The book is a *sine qua non* for any clinic contemplating such treatment. Illustrations are excellent, while the bibliography and index are valuable even in a book that must be read from cover to cover to fully appreciate the authors' viewpoints. In fact one will look in vain in the index for a reference to indications for operation, complications, post-operative epilepsy, dementia præcox and involutional melancholia but material will be found in the text. This criticism should be tempered by the fact that even diagnostically clear cut psychiatric cases must be considered individually and do not lend themselves to statistics.

Anatomy of the Nervous System. O. Larsell. 443 pp., illust. $6.50. University of Toronto Press, 1942.

This book represents a revision and expansion of the author's "Textbook of Neuro-Anatomy and the Sense Organs". It is "intended primarily for medical students as an aid in organizing the complex structure of the nervous system", and deals comprehensively with the brain, spinal cord, autonomic system and sense organs, placing emphasis purposely on internal structure and functional significance rather than on gross anatomy. Embryology is introduced as a necessary basis for the understanding of adult structures, and lesions of the nervous system are summarized in many of the chapters in order to stress the functional aspects. Its 341 clear and well labelled illustrations include an atlas of sections through the brain and spinal cord. As those who are acquainted with the author's other publications would expect, the descriptions are clear, thorough, up-to-date and well documented.

It is not, of course, a criticism of the book itself if it prompts one to ask whether, in the training of medical practitioners of this continent, there has not beeen a replacement of the justly condemned academic details of gross anatomy by equally academic details of neuro-histology.

Surgical Diseases of the Spinal Cord, Membranes and Nerve Roots. C. A. Elsberg. 598 pp., illust. $14.00. P. B. Hoeber, N.Y., 1941.

This book is a very complete and up-to-date record of its subject. The chief value to the surgeon is to be found in the author's wide clinical experience. The frequent use of the personal pronoun brings the reader close to this great clinician and makes the discussions intimate and pleasing. His broad experience, extending over many years as it does, is frequently expressed in statistical terms.

The chapter on lumbar puncture could be read by every practitioner of medicine with profit. The reproduction of x-ray plates is excellent, and Dr. Dyke's review of x-ray diagnosis is comprehensive. In the diagnosis of intervertebral disc lesions more emphasis could be placed on the clinical diagnosis, and less on the diagnosis by means of lipiodol injection and x-ray examination. Pathology of spinal cord tumours is thoroughly reviewed in a chapter by Wolf. The illustrations are simple and clear and are without too much detail.

BOOKS RECEIVED

Organization and Administration of Group Medical Practice. D. A. Clark and K. G. Clark. 109 pp. $0.25. Ed. A. Filene Good Will Fund, Inc., Boston, 1941.

How to Organize Group Health Plans. M. W. Brown, K. G. Clark and P. R. Taylor. 72 pp. $0.25. Ed. A. Filene Good Will Fund, Inc., Boston, 1942.

The 1941 Year Book of Pathology and Immunology. H. T. Karsner and S. B. Hooker. 623 pp. $3.00. Year Book Publishers, Chicago, 1941.

Transactions of American Association of Genito-Urinary Surgeons. Vol. 34. 276 pp., illust. Bruce Pub. Co., Saint Paul, Min., 1941.

Foundations for a Science of Personality. A. Angyal. 398 pp. $2.25. Commonwealth Fund, N.Y., 1941.

Lecciones de Patologia Infecciosa. C. A. Videla. 118 pp. Cayetano Vergara, Buenos Aires, 1940.

The 1941 Year Book of Industrial and Orthopædic Surgery. Edited by C. F. Painter. 432 pp. $3.00. Year Book Publishers, Chicago, 1941.

The Problem of Tumours. J. C. Mottram. 91 pp. 7s. 6d. H. K. Lewis, London, 1942.

Community Organization for Health Education. Report by a Committee of the same name. 120 pp. $0.90. American Public Health Association, 1790 Broadway, New York, 1941.

Manual of Diseases of the Eye. C. H. May and C. A. Perera. 17th ed., 519 pp., illust. $4.60. University of Toronto Press, 1941.

The British Encyclopædia of Medical Practice Index. Edited by H. Rolleston *et al.* 486 pp. Butterworth, Toronto, 1941.

Practical Methods in Biochemistry. F. C. Koch. 3rd ed., 314 pp. $2.25. University of Toronto Press, 1941.

Bibliographia Primatologica. T. C. Ruch. Part 1, 241 pp. $8.50. C. C. Thomas, Springfield, 1941.

Nutrition in Health and Disease. L. F. Cooper, E. M. Barber and H. S. Mitchell. 8th ed., 709 pp., illust. $3.50. Lippincott, Montreal, 1941.

About Ourselves. J. G. Needham. 276 pp. $3.00. J. Cattell Press, Lancaster, Pa., 1941.

Diseases of the Nervous System. F. M. R. Walshe. 2nd ed., 325 pp. $3.25. Macmillan, Toronto, 1941.

Pneumoconiosis (Silicosis) the Story of Dusty Lungs. L. G. Cole and W. G. Cole. John B. Pierce Foundation, 40 West 40th St., New York, 1941.

(A copy will be sent free to any doctor by applying, on his letterhead, to Mr. O'Brien of the Foundation.)